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AERODYNAMIC DATA ON A LARGE SEMISPAN TILTING WING WITH A 0.5-DIAMETER CHORD, A SINGLE-SLOTTED FLAP, AND BOTH LEFT- AND RIGHT-HAND ROTATION OF A SINGLE PROPELLER

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Langley Station, Hampton, Va.

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SUMMARY

An investigation has been made in the Langley full-scale tunnel to determine the longitudinal aerodynamic characteristics of a large-scale semispan V/STOL tilt-wing configuration having a single propeller rotating in both left- and right-hand directions. The model was tested in the presence of a half-fuselage, and the loads on the fuselage were measured separately. The wing had a chord-to-propeller-diameter ratio of 0.5, a 40-percent-chord single-slotted flap, an aspect ratio of 4.88 (2.44 for the semispan), a taper ratio of 1.0, and an NACA 4415 airfoil section. Tests were made of the configuration with and without leading-edge slat and fences.

The data have not been analyzed in detail, but have been examined to observe the predominant trends. It was found that the direction of propeller rotation had a very significant effect on the lift and descent capability (as determined from values of drag-to-lift ratio attainable without stalling of any part of the wing within the propeller slipstream) and that up-at-the-tip (right-hand) rotation gave the more favorable results. The use of a trailing-edge flap was also very effective in increasing the descent capability. The use of leading-edge flow-control devices was effective in increasing the descent capability and lift for the down-at-the-tip (left-hand) propeller rotation where the characteristics without such devices were poor, but was much less effective for the case of up-at-the-tip propeller rotation where reasonably favorable results were achieved without leading-edge devices. For the most favorable combination of the configuration variables (a full-span slat, 60° flap deflection, and fences on), descent angles of 20° or more were achieved over the entire test range of power conditions.

INTRODUCTION

Most of the aerodynamic research that has been done on the tilt-wing propeller-driven V/STOL configuration in the past has been of an exploratory character and has been done with small-scale models. The interest in this type of airplane has now become so substantial, however, that there is need for large-scale systematic aerodynamic design data for this type of airplane. A program has therefore been inaugurated at the Langley Research Center to provide such information by means of tests of a large-scale semispan tilt-wing propeller-driven model. The results of tests for the wing alone are given in references 1 to 4, and the results of tests of one of the wing configurations in the presence of a fuselage are given in reference 5.

The results reported in the present investigation are for a wing with a single-slotted flap tested in the presence of the fuselage. This investigation was made with a semispan model having a half-fuselage, a single propeller on the semispan wing, and a chord-diameter ratio of 0.5. Tests were made of the configuration with and without a leading-edge slat and fences. The investigation covered a range of angles of attack from 0° to 85° and a range of thrust coefficients from 0.30 to 0.90. Included in the investigation were tests with both left- and right-hand directions of propeller rotation. The lift, drag, and pitching moments of the model were measured over the range of test conditions. The flow was observed by means of tufts on the upper surface of the wing.

SYMBOLS

The positive sense of forces, moments, and angles is shown in figure 1. The pitching-moment coefficients are referred to the wing quarter-chord line. The slipstream coefficients are based on the dynamic pressure in the propeller slipstream. Conventional lift, drag, and pitching-moment coefficients based on the free-stream dynamic pressure can be obtained by dividing the slipstream coefficients by $(1 - C_{T,s})$; for example, $C_L = C_{L,s}/(1 - C_{T,s})$. The thrust coefficient C_T' may be found from the equation $C_T' = C_{T,s}(A/S)/(1 - C_{T,s})$.

Measurements for this investigation were made in the U.S. Customary System of Units. Equivalent values are indicated herein in the International System (SI) in the interest of promoting the use of this system in future NASA reports. Factors relating the two systems of units used in this paper may be found in the appendix.

The coefficients and symbols used in this paper are defined as follows:

A	total propeller-disk area, ft^2 (meters^2)
b	propeller-blade chord, ft (meters); or wing span, ft (meters)
$C_{D,s}$	drag coefficient based on slipstream, D/q_sS
C_L	lift coefficient based on free airstream, L/qS

$C_{L,s}$ lift coefficient based on slipstream, L/q_sS

$C_{L,s(fus)}$ fuselage lift coefficient based on slipstream

$C_{m,s}$ pitching-moment coefficient based on slipstream, M_Y/q_sSc

C_T' thrust coefficient based on free airstream, T/qS

$C_{T,s}$ thrust coefficient based on slipstream, $\dfrac{T}{q_s \frac{\pi D^2}{4}}$

c wing chord, ft (meters)

c_f length of flap chord, ft (meters)

D propeller diameter, ft (meters); also, total model drag, lbf (newtons)

h width of slat or of flap-slot gap; also thickness of propeller blade, ft (meters)

L total model lift, lbf (newtons)

M_Y pitching moment, lbf-ft (newton-meters)

q free-stream dynamic pressure, $\frac{\rho V^2}{2}$, lbf/ft^2 (newtons/meter^2)

q_s slipstream dynamic pressure, $q + \dfrac{T}{\frac{\pi D^2}{4}}$, lb/ft^2 (newtons/meter^2)

R radius of propeller blade, 2.83 ft (0.86 meter)

r radius to element on propeller blade, ft (meters)

S area of semispan wing, 19.60 ft^2 (1.82 meters^2)

T propeller thrust, lbf (newtons)

V free-stream velocity, ft/sec (meters/second)

x longitudinal distance, ft (meters)

y_l	lower-surface ordinate, ft (meters)
y_u	upper-surface ordinate, ft (meters)
z	vertical distance, ft (meters)
α	angle of attack, degrees
δ_f	flap deflection, degrees
ρ	mass density of air, slugs/ft^3 (kilograms/meter^3)

MODEL

The model used in this investigation was a semispan model which would represent the left panel of the full-span wing and the left half of the fuselage. The principal dimensions of the wing are given in figure 2. A three-view drawing of the fuselage-wing combination is given in figure 3. The propeller-blade characteristics are given in figure 4.

The wing was mounted on the scale balance system in the tunnel so that the lift and drag of the wing were read directly about the wind axis. The wing pivoted about its quarter-chord point, and its pitching moments were measured about this point and are referred to this point for the data presentation. When the half-fuselage was added to the existing wing model, it was necessary to cause the fuselage to move relative to the wing-quarter-chord point in order to avoid structural conflict between the wing and the fuselage. The fuselage was consequently mounted on a parallel arm arrangement so that it moved as the wing angle of attack was varied. The fuselage moved as though it were pivoted at the 58-percent-chord station on the wing lower surface. The illustration in figure 3 shows the relationship of the wing to the fuselage at a given angle of the wing. Since the fuselage was not actually attached to the wing, its forces did not register on the wing balance. Therefore, the loads on the fuselage (lift only) were measured on separate strain-gage balances. At all times, the fuselage remained at zero angle of attack relative to the airstream.

The wing was constructed to allow numerous modifications to be made in the test configuration, such as a change of airfoil, the addition of flow-control devices, deflection of the trailing-edge flap, changing the direction of rotation of the propeller, and wing planform. The basic structure of the wing consists of a heavy box-beam spar to which a power train to drive the propellers through spanwise shafting is attached and around which various airfoil contours can be fitted. The propeller location was such that the propeller tip extended out to the wing tip. In the present investigation, both right- and left-hand directions of propeller rotation were used. The propeller thrust was measured by a strain-gage balance which was a part of the propeller shaft. The output was fed through sliprings to an indicating instrument. The required values of thrust for each value of $C_{T,s}$ were set by the operator by changing the speed of the drive motor. The blade angle at the 0.75R station of the propeller was held constant at 17° throughout the investigation. The thrust axis was inclined upward 4° from the chord line of the wing to correspond approximately to the zero-lift line of the airfoil.

The basic wing had an NACA 4415 airfoil section and the chord was 2.83 ft (0.86 m) long. This chord length gave a ratio of wing chord to propeller diameter of 0.5. The reference area of the wing, based on a semispan of 6.92 ft (2.11 m), was 19.6 ft^2 (1.82 m^2) and did not include the area of the tip fairing.

The model had a 0.40c single-slotted trailing-edge flap. The ordinates and the positions for the various deflections are given in figure 2(c). The flap illustrated in figure 2(c) is deflected 40°.

The leading-edge slat shown in figure 2(b) was investigated either as a full-span or an inboard slat configuration. The slat was deflected 30° and was in a low position with respect to the wing chord line. For that part of the wing which extended across the top of the fuselage, the slat was deflected 10° and was in a high position to avoid touching the fuselage at low angles of attack ($\alpha = 5^{\circ}$); otherwise, the minimum angle of attack would have been about 15°.

Fences having a height of 0.20c and extending from 0.13c on the lower surface around the leading edge to about 0.75c on the upper surface were installed at two spanwise locations on the wing (see fig. 2(d)) in an attempt to confine the center-section stall inboard of the propeller slipstream. When tests were made with fences on, both fences were installed.

TESTS

The model was tested with and without the leading-edge slat and fences for deflections of the single-slotted flap from 20° to 60°. The specific wing configurations tested, together with a list of tables and figures in which the data for each may be found, are given in the following table:

Direction of rotation	Configuration	Flap deflection, δ_f, deg	Table (*)	Figure	
				Aerodynamic data	Fuselage lift coefficients
Up at tip (right hand)	Basic leading edge	20	1	5	27
	Basic leading edge	40	2	6	27
	Basic leading edge	60	3	7	27
	Inboard slat	20	4	8	28
	Inboard slat	40	5	9	28
	Inboard slat	60	6	10	28
	Inboard slat with fences on	20	7	11	29
	Inboard slat with fences on	40	8	12	29
	Inboard slat with fences on	60	9	13	29
	Full-span slat with fences on	20	10	14	30
	Full-span slat with fences on	40	11	15	30
	Full-span slat with fences on	60	12	16	30
Down at tip (left hand)	Basic leading edge	20	13	17	31
	Basic leading edge	40	14	18	31
	Basic leading edge	60	15	19	31
	Inboard slat	20	16	20	32
	Inboard slat	40	17	21	32
	Inboard slat	60	18	22	32
	Inboard slat with fences on	20	19	23	33
	Inboard slat with fences on	40	20	24	33
	Inboard slat with fences on	50	21	25	33
	Inboard slat with fences on	60	22	26	33

*The (a) part of each table gives the tabulated wing data and the (b) part gives the tabulated fuselage data.

The tests were made over a range of thrust coefficients from 0.30 to 0.90. For any given test the thrust coefficient was held constant over the angle-of-attack range by adjusting the propeller speed to give the required thrust at each angle of attack. The angles of attack ranged from 5° to that required to stall the wing or to develop a drag-to-lift ratio of about 0.3, whichever was lower. The test Reynolds number, based on the wing chord length and the velocity of the propeller slipstream, was about 2.38×10^{6}.

No tunnel-wall corrections have been applied to the data since surveys and analysis had indicated that there would be no significant correction, as explained in reference 1.

DISCUSSION

The data presented have not been analyzed in detail but have been examined to observe general trends. One very general observation was that the force-test data could not be used as an indication of the occurrence or extent of wing stalling. The tuft-test results show that the onset of stalling over significant areas of the part of the wing within the propeller slipstream frequently occurs at an angle of attack as much as 20° to 30° below or above the angle of attack for maximum lift coefficient depending upon direction of propeller rotation and configuration. The data were examined, in particular, to determine the effect of the various test variables on descent capability – the descent capability being determined from the D/L values attainable just prior to indication by the tufts of stalling of any part of the wing within the propeller slipstream.

Effect of Direction of Propeller Rotation

The force- and tuft-test data show that the up-at-the-tip direction of propeller rotation (right-hand rotation), in general, gave higher maximum lift and higher descent capability. In general, the tuft pictures show that, with down-at-the-tip rotation (left-hand rotation), rough flow and stalling (as indicated by areas on the wing where the tufts are swirling violently or have become very limp and are pointed in random directions) occurred at an angle of attack as much as 20° to 30° lower than it appears on the wing with up-at-the-tip rotation for the higher thrust coefficient ($C_{T,s} = 0.90$). Down-at-the-tip propeller rotation consistently causes stalling (of the part of the wing in the slipstream) to start inboard of the nacelle, that is, behind the up-going blades. The up-at-the-tip mode of rotation, on the other hand, may result in the onset of stalling occurring either inboard or outboard of the nacelle but for either stall location there was a strong outward spanwise flow in the boundary layer. These conditions did not occur with the propeller rotating down at the tip.

Effect of Leading-Edge Slat

The effect of the inboard leading-edge slat can be seen by comparison of figures 5 to 10 for up-at-the-tip rotation and figures 17 to 22 for down-at-the-tip rotation. (See tables 1 to 6 and tables 13 to 18.) These data show that for the higher thrust coefficients ($C_{T,s} = 0.90$ and 0.80) the slat had little effect on the lift or drag characteristics of the wing or on descent capability. There was, however, some slight increase in lift and descent capability for the case of the lower thrust coefficients ($C_{T,s} = 0.60$ and 0.30). The use of the full-span slat and fences indicated a slight improvement in force-test results over those obtained with the inboard slat and fences. (See figs. 11 to 16.) The tuft tests results, however, show that the full-span slat delayed the stall to significantly higher angles of attack than did the inboard slat, resulting in a higher descent capability.

Effect of Fences

The effect of fences can be ascertained for both directions of propeller rotation, but only for the configuration with the leading-edge slat on. (Compare figs. 8 to 13 and figs. 20 to 26.) These results, as was the case for previous investigations, show that the fences were most effective for the configuration with the down-at-the-tip mode of propeller rotation. In this rotation mode, the wing has a tendency to stall inboard of the nacelle due to the rotation of the propeller slipstream, and the fences are effective in preventing the center-section stall from spreading and prematurely triggering stalling of the section of the wing in the propeller slipstream inboard of the nacelle. Specifically, the results of the present tests show that the fences had practically no effect on either lift or descent capability for the configuration with up-at-the-tip propeller rotation; but, for the configuration with down-at-the-tip propeller rotation, the fences were beneficial in improving the lift and descent capability at some conditions, but was detrimental at others.

Effect of Flap Deflection

There was a progressive increase in maximum lift coefficient and descent capability as flap deflection was increased from 20^{o} to 60^{o}. In fact the model with up-at-the-tip propeller rotation had a descent capability of about 12^{o} without any leading-edge flow-control devices for the configuration with the 60^{o} flap deflection. The descent capability due to flap deflection for down-at-the-tip propeller rotation, however, was not as significant with the basic leading edge. With the most favorable combination of the configuration variables (up-at-tip propeller rotation, full-span slat, 60^{o} flap deflection, and fences on), a descent capability of 20^{o} or more was obtained. (See fig. 16.)

Fuselage Lift

The fuselage lift coefficients plotted in figures 27 to 33 are based on the same parameters as used in the reduction of the data for the wing lift coefficients. In general, the maximum fuselage lift occurred at about the angle of attack for maximum lift. This trend was true for the various flap deflections and for both directions of propeller rotation. The slat and fences had no appreciable effect on the fuselage loading.

CONCLUSIONS

An experimental investigation to determine the longitudinal aerodynamic characteristics of a large-scale semispan V/STOL tilt-wing configuration having a single propeller rotating up or down at the tip (right- or left-hand direction of rotation, respectively) has been made. The wing, which has a single-slotted flap, was tested in the presence of a fuselage. The following conclusions were drawn from the results of this investigation:

1. The direction of propeller rotation had a significant effect on the lift and descent capability attainable for most of the configurations tested, with the up-at-the-tip (right-hand) mode of propeller rotation giving the more favorable results.

2. Leading-edge flow-control devices were effective in improving the descent capability which was poor without these devices for the down-at-the-tip (left-hand) mode of propeller rotation; but was much less effective for the case of up-at-the-tip propeller rotation where reasonably favorable results were achieved without leading-edge devices.

3. Deflecting the flaps was very effective in increasing the lift and the descent capability for either mode of rotation. For the configuration with the 60° flap deflection, with the up-at-the-tip rotation, and with the slat and fences on, descent angles of 20° or more were achieved over the entire test range of power conditions.

Langley Research Center,
National Aeronautics and Space Administration,
Langley Station, Hampton, Va., September 1, 1966,
721-01-00-11-23.

APPENDIX

CONVERSION FACTORS – U.S. CUSTOMARY UNITS TO SI UNITS

The International System of Units (SI) was adopted by the Eleventh General Conference on weights and measures, Paris, October 1960. (See ref. 6.) The following conversion factors are included in this report for convenience:

Physical quantity	U.S. Customary Unit	Conversion factor (*)	SI Unit
Area	ft^2	0.0929	$meters^2$ (m^2)
Density	$slugs/ft^3$	515.379	$kilograms/meter^3$ (kg/m^3)
Force	lbf	4.448	newtons (N)
Length	in.	0.0254	meters (m)
	ft	0.3048	meters (m)
Moment	lbf-ft	1.356	newton-meters (N-m)
Pressure	lbf/ft^2	47.88	$newtons/meter^2$ (N/m^2)
Velocity	ft/sec	0.3048	meters/second (m/sec)

*Multiply value given in U.S. Customary Unit by conversion factor to obtain equivalent value in SI Unit.

REFERENCES

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2. Fink, Marvin P.; Mitchell, Robert G.; and White, Lucy C.: Aerodynamic Data on Large Semispan Tilting Wing With 0.6-Diameter Chord, Single-Slotted Flap, and Single Propeller Rotating Down at Tip. NASA TN D-2412, 1964.
3. Fink, Marvin P.; Mitchell, Robert G.; and White, Lucy C.: Aerodynamic Data on Large Semispan Tilting Wing With 0.6-Diameter Chord, Single Slotted Flap, and Single Propeller Rotating Up at Tip. NASA TN D-1586, 1964.
4. Fink, Marvin P.; Mitchell, Robert G.; and White, Lucy C.: Aerodynamic Data on a Large Semispan Tilting Wing With 0.5-Diameter Chord, Double-Slotted Flap, and Both Left- and Right-Hand Rotation for a Single Propeller. NASA TN D-3375, 1966.
5. Fink, Marvin P.: Aerodynamic Data on a Large Semispan Tilting Wing With a 0.5-Diameter Chord, a Double-Slotted Flap, and Left- and Right-Hand Rotation of a Single Propeller, in Presence of Fuselage. NASA TN D-3674, 1966.
6. Mechtly, E. A.: The International System of Units – Physical Constants and Conversion Factors. NASA SP-7012, 1964.

TABLE 1.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION UP AT TIP, BASIC LEADING EDGE, AND $\delta_f = 20^{\circ}$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
	$C_{T,s} = 0.90$			$C_{T,s} = 0.80$		
0	0.434	-1.107	-0.105	0.504	-0.958	-0.123
5	.607	-1.049	-.092	.715	-.891	-.114
10	.773	-.978	-.092	.918	-.807	-.111
15	.924	-.879	-.084	1.105	-.706	-.105
20	1.064	-.770	-.086	1.274	-.573	-.107
25	1.190	-.649	-.085	1.410	-.425	-.103
30	1.266	-.525	-.092	1.470	-.272	-.103
35	1.343	-.385	-.081	1.524	-.125	-.098
40	1.405	-.248	-.075	1.558	.017	-.092
45	1.430	-.119	-.077	1.550	.135	-.075
50	1.446	.005	-.073	1.541	.252	-.057
55	1.428	.101	-.052	1.519	.366	-.043
60	1.407	.194	-.048	1.489	.466	-.025
65	1.384	.284	-.020	1.433	.549	-.002
70	1.361	.387	-.006			
75	1.319	.455	.011			
80	1.250	.480	.065			
85	1.230	.501	.106			
	$C_{T,s} = 0.60$			$C_{T,s} = 0.30$		
0	0.568	-0.674	-0.152	0.641	-0.297	-0.183
5	.843	-.608	-.137	.992	-.212	-.171
10	1.117	-.502	-.141	1.315	-.105	-.174
15	1.377	-.371	-.128	1.643	.054	-.169
20	1.577	-.220	-.137	1.866	.222	-.171
25	1.715	-.060	-.123	2.037	.393	-.177
30	1.717	.097	-.127	1.935	.585	-.175
35	1.698	.256	-.116	1.711	.695	-.161
40	1.662	.369	-.094	1.506	.746	-.139
45	1.581	.460	-.077			
50	1.482	.534	-.042			
55	1.454	.602	-.030			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
0	0.022	0.036	0.042	0.045
5	.027	.038	.053	.046
10	.027	.043	.058	.051
15	.030	.052	.073	.068
20	.033	.060	.083	.085
25	.046	.067	.087	.082
30	.051	.084	.105	.078
35	.040	.087	.107	.093
40	.033	.081	.100	.086
45	.029	.087	.099	----
50	.041	.086	.088	----
55	.039	.084	.083	----
60	.021	.082	----	----
65	-.002	.077	----	----
70	-.009	----	----	----
75	-.006	----	----	----
80	-.005	----	----	----
85	-.060	----	----	----

TABLE 2.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION UP AT TIP, BASIC LEADING EDGE, AND $\delta_f = 40^{\circ}$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
		$C_{T,s} = 0.90$			$C_{T,s} = 0.80$	
0	0.644	-1.004	-0.174	0.747	-0.844	-0.199
5	.818	-.928	-.172	.961	-.753	-.195
10	.976	-.828	-.170	1.154	-.642	-.202
15	1.113	-.711	-.178	1.321	-.507	-.202
20	1.230	-.582	-.181	1.473	-.349	-.199
25	1.334	-.446	-.175	1.581	-.199	-.194
30	1.412	-.302	-.168	1.587	-.056	-.188
35	1.456	-.169	-.162	1.588	.067	-.163
40	1.481	-.034	-.155	1.567	.170	-.140
45	1.484	.088	-.146	1.553	.281	-.118
50	1.460	.179	-.124	1.514	.368	-.093
55	1.418	.229	-.097	1.491	.450	-.065
60	1.390	.295	-.067	1.451	.531	-.033
65	1.360	.383	-.043	1.395	.610	-.008
70	1.314	.439	-.022			
75	1.263	.485	-.002			
80	1.206	.484	.058			
85	1.197	.531	.097			
		$C_{T,s} = 0.60$			$C_{T,s} = 0.30$	
0	0.869	-0.553	-0.280	1.013	-0.152	-0.275
5	1.181	-.450	-.242	1.361	-.039	-.270
10	1.430	-.323	-.245	1.686	.107	-.286
15	1.631	-.149	-.237	1.994	.287	-.289
20	1.846	.033	-.246	2.208	.500	-.288
25	1.876	.178	-.223	2.210	.653	-.266
30	1.797	.285	-.177	2.000	.757	-.198
35	1.735	.409	-.158	1.672	.793	-.175
40	1.624	.473	-.117			
45	1.528	.511	-.073			
50	1.390	.570	-.053			
55	1.252	.610	-.038			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
0	0.025	0.049	0.075	0.092
5	.022	.054	.087	.091
10	.022	.061	.094	.095
15	.022	.070	.105	.110
20	.033	.082	.117	.115
25	.039	.082	.109	.098
30	.039	.087	.119	.087
35	.037	.081	.107	.091
40	.023	.076	.103	----
45	.024	.084	.084	----
50	.025	.081	.079	----
55	.015	.077	.066	----
60	.002	.078	----	----
65	-.002	.069	----	----
70	-.016	----	----	----
75	-.027	----	----	----
80	-.016	----	----	----
85	-.063	----	----	----

TABLE 3.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION UP AT TIP, BASIC LEADING EDGE, AND $\delta_f = 60^{\circ}$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
	$C_{T,s} = 0.90$			$C_{T,s} = 0.80$		
0	0.847	-0.823	-0.237	1.003	-0.654	-0.275
5	1.003	-.722	-.245	1.192	-.527	-.290
10	1.140	-.592	-.259	1.365	-.389	-.284
15	1.264	-.463	-.268	1.504	-.250	-.274
20	1.363	-.325	-.254	1.601	-.101	-.281
25	1.427	-.186	-.253	1.687	.077	-.272
30	1.460	-.043	-.250	1.645	.177	-.250
35	1.490	.093	-.242	1.592	.256	-.207
40	1.482	.203	-.215	1.535	.325	-.174
45	1.453	.273	-.196	1.493	.413	-.144
50	1.405	.301	-.152	1.460	.489	-.117
55	1.346	.366	-.146	1.417	.549	-.079
60	1.305	.447	-.131	1.383	.605	-.041
65	1.266	.426	-.071	1.340	.645	-.013
70	1.235	.460	-.030			
75	1.194	.470	.013			
80	1.146	.459	.062			
85	1.141	.478	.091			
	$C_{T,s} = 0.60$			$C_{T,s} = 0.30$		
0	1.219	-0.355	-0.321	1.393	0.064	-0.353
5	1.465	-.211	-.327	1.693	.195	-.353
10	1.698	-.065	-.328	2.007	.386	-.361
15	1.880	.121	-.323	2.251	.578	-.373
20	2.002	.298	-.309	2.365	.765	-.344
25	1.920	.420	-.265	2.192	.846	-.293
30	1.777	.473	-.205	1.824	.848	-.206
35	1.638	.518	-.149			
40	1.509	.538	-.095			
45	1.390	.551	-.050			
50	1.235	.562	-.041			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
0	0.008	0.053	0.118	0.145
5	.010	.061	.122	.147
10	.022	.069	.130	.142
15	.024	.073	.132	.144
20	.024	.078	.136	.131
25	.029	.097	.122	.100
30	.032	.089	.116	.081
35	.031	.077	.100	----
40	.029	.072	.084	----
45	.025	.076	.072	----
50	.009	.078	.055	----
55	.019	.069	----	----
60	.027	.070	----	----
65	-.019	.064	----	----
70	-.024	----	----	----
75	-.033	----	----	----
80	-.031	----	----	----
85	-.073	----	----	----

TABLE 4.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION UP AT TIP, INBOARD SLAT, AND $\delta_f = 20^o$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
		$C_{T,s} = 0.90$			$C_{T,s} = 0.80$	
5	0.509	-1.028	-0.068	0.579	-0.878	-0.082
10	.668	-.971	-.052	.791	-.809	-.078
15	.835	-.890	-.059	1.010	-.712	-.077
20	.989	-.780	-.067	1.204	-.585	-.092
25	1.122	-.668	-.064	1.370	-.431	-.098
30	1.259	-.525	-.076	1.502	-.279	-.095
35	1.356	-.372	-.079	1.558	-.124	-.103
40	1.410	-.241	-.073	1.589	.033	-.095
45	1.430	-.122	-.070	1.591	.166	-.091
50	1.434	-.008	-.070	1.586	.293	-.068
55	1.427	.105	-.060	1.545	.385	-.044
60	1.418	.213	-.046	1.512	.475	-.022
65	1.380	.282	-.023	1.443	.546	.008
70	1.351	.377	-.010	1.345	.598	.031
75	1.299	.423	.026	1.236	.626	.053
80	1.241	.480	.055			
85	1.246	.538	.104			
		$C_{T,s} = 0.60$			$C_{T,s} = 0.30$	
5	0.657	-0.613	-0.102	0.750	-0.227	-0.136
10	.975	-.524	-.119	1.166	-.121	-.159
15	1.286	-.389	-.132	1.578	.029	-.167
20	1.544	-.241	-.139	1.848	.200	-.167
25	1.724	-.070	-.123	2.039	.368	-.146
30	1.867	.099	-.123	2.149	.575	-.143
35	1.864	.266	-.104	2.138	.728	-.127
40	1.772	.370	-.071	1.870	.752	-.108
45	1.689	.484	-.064	1.566	.750	-.104
50	1.622	.606	-.051	1.358	.830	-.116
55	1.467	.651	-.021			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	0.026	0.047	0.063	0.058
10	.026	.054	.075	.083
15	.024	.056	.069	.069
20	.026	.059	.069	.063
25	.027	.061	.078	.060
30	.031	.071	.085	.086
35	.039	.074	.088	.080
40	.048	.083	.101	.058
45	.050	.086	.094	.044
50	.050	.084	.084	.027
55	.049	.077	.078	----
60	.049	.070	----	----
65	.040	.055	----	----
70	.053	.053	----	----
75	.016	.036	----	----
80	.013	----	----	----
85	-.058	----	----	----

TABLE 5.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION UP AT TIP, INBOARD SLAT, AND $\delta_f = 40^o$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
		$C_{T,s} = 0.90$			$C_{T,s} = 0.80$	
5	0.638	-0.939	-0.117	0.772	-0.786	-0.144
10	.818	-.859	-.121	.980	-.683	-.141
15	.982	-.751	-.128	1.201	-.555	-.164
20	1.121	-.625	-.137	1.389	-.398	-.172
25	1.258	-.484	-.146	1.539	-.229	-.179
30	1.363	-.338	-.152	1.614	-.073	-.188
35	1.437	-.182	-.153	1.606	.052	-.173
40	1.465	-.049	-.144	1.621	.192	-.163
45	1.464	.058	-.136	1.580	.283	-.133
50	1.442	.150	-.124	1.563	.393	-.097
55	1.420	.243	-.110	1.520	.469	-.058
60	1.385	.311	-.087	1.483	.552	-.037
65	1.332	.348	-.056			
70	1.309	.432	-.032			
75	1.254	.463	.005			
80	1.198	.489	.050			
85	1.194	.502	.098			
		$C_{T,s} = 0.60$			$C_{T,s} = 0.30$	
5	0.920	-0.491	-0.178	1.123	-0.086	-0.228
10	1.266	-.363	-.203	1.552	.075	-.258
15	1.571	-.194	-.228	1.941	.267	-.271
20	1.801	-.008	-.235	2.197	.455	-.267
25	1.914	.167	-.216	2.305	.630	-.245
30	2.006	.340	-.188	2.335	.808	-.194
35	1.953	.455	-.152	2.008	.779	-.128
40	1.736	.483	-.097	1.760	.786	-.107
45	1.663	.577	-.073	1.446	.783	-.102
50	1.546	.644	-.052			
55	1.373	.654	-.018			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	0.034	0.054	0.075	0.099
10	.037	.064	.091	.114
15	.038	.066	.090	.102
20	.043	.075	.094	.092
25	.043	.079	.093	.110
30	.044	.079	.102	.102
35	.042	.085	.088	.066
40	.046	.086	.094	.044
45	.048	.077	.088	.029
50	.048	.070	.076	----
55	.051	.072	.069	----
60	.044	.068	----	----
65	.045	----	----	----
70	.049	----	----	----
75	.005	----	----	----
80	.037	----	----	----
85	-.051	----	----	----

TABLE 6.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION UP AT TIP, INBOARD SLAT, AND $\delta_f = 60^o$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
		$C_{T,s} = 0.90$			$C_{T,s} = 0.80$	
5	0.824	-0.799	-0.158	1.001	-0.597	-0.237
10	.994	-.685	-.192	1.198	-.462	-.244
15	1.137	-.551	-.214	1.381	-.318	-.245
20	1.237	-.422	-.216	1.548	-.130	-.263
25	1.353	-.259	-.221	1.638	.024	-.267
30	1.404	-.123	-.224	1.648	.163	-.252
35	1.457	.026	-.212	1.584	.252	-.239
40	1.465	.154	-.207	1.563	.364	-.198
45	1.434	.225	-.182	1.549	.443	-.152
50	1.389	.300	-.166	1.511	.519	-.116
55	1.359	.359	-.130	1.446	.551	-.080
60	1.306	.357	-.086	1.403	.591	-.038
65	1.269	.400	-.065	1.358	.635	.001
70	1.236	.440	-.019			
75	1.207	.530	-.014			
		$C_{T,s} = 0.60$			$C_{T,s} = 0.30$	
5	1.182	-0.308	-0.256	1.411	0.103	-0.293
10	1.493	-.145	-.280	1.862	.327	-.335
15	1.803	.076	-.313	2.147	.540	-.352
20	1.992	.281	-.306	2.363	.747	-.334
25	2.077	.469	-.297	2.409	.907	-.291
30	2.066	.571	-.240	2.287	.953	-.192
35	1.897	.570	-.153			
40	1.621	.548	-.091			
45	1.518	.599	-.048			
50	1.356	.625	-.034			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	0.033	0.057	0.086	0.126
10	.041	.065	.098	.128
15	.050	.074	.101	.107
20	.054	.079	.101	.105
25	.054	.080	.108	.109
30	.055	.079	.102	.092
35	.051	.078	.086	----
40	.046	.076	.083	----
45	.040	.071	.075	----
50	.042	.074	.054	----
55	.043	.063	----	----
60	.042	.056	----	----
65	.011	.048	----	----
70	.024	----	----	----
75	.045	----	----	----

TABLE 7.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION UP AT TIP, INBOARD SLAT, FENCES ON, AND $\delta_f = 20^o$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
		$C_{T,s}$ = 0.90			$C_{T,s}$ = 0.80	
5	0.493	-1.026	-0.054	0.563	-0.882	-0.077
10	.656	-.963	-.050	.773	-.811	-.076
15	.823	-.884	-.054	.985	-.716	-.074
20	.973	-.780	-.057	1.211	-.576	-.091
25	1.120	-.665	-.063	1.374	-.429	-.093
30	1.235	-.532	-.066	1.510	-.273	-.093
35	1.305	-.400	-.069	1.589	-.108	-.103
40	1.396	-.237	-.070	1.649	.075	-.114
45	1.456	-.097	-.071	1.661	.212	-.109
50	1.461	.029	-.068	1.627	.309	-.074
55	1.444	.130	-.058	1.587	.407	-.052
60	1.401	.196	-.044	1.506	.474	-.028
65	1.373	.277	-.031	1.414	.537	-.001
70	1.336	.354	-.007	1.317	.561	.022
75	1.301	.424	.025	1.229	.597	.048
80	1.259	.478	.085			
85	1.260	.521	.150			
		$C_{T,s}$ = 0.60			$C_{T,s}$ = 0.30	
5	0.653	-0.609	-0.103	0.746	-0.225	-0.131
10	.963	-.515	-.111	1.162	-.110	-.148
15	1.278	-.386	-.116	1.556	.051	-.164
20	1.539	-.233	-.132	1.838	.203	-.163
25	1.729	-.069	-.117	2.093	.386	-.155
30	1.865	.114	-.106	2.135	.599	-.150
35	1.935	.292	-.099	2.148	.770	-.127
40	1.885	.454	-.082	1.763	.721	-.113
45	1.842	.585	-.072	1.586	.821	-.117
50	1.712	.679	-.047			
55	1.595	.750	-.042			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s}$ = 0.90	$C_{T,s}$ = 0.80	$C_{T,s}$ = 0.60	$C_{T,s}$ = 0.30
5	0.037	0.050	0.062	0.057
10	.038	.056	.083	.096
15	.033	.061	.085	.088
20	.033	.063	.089	.084
25	.037	.070	.093	.089
30	.046	.079	.094	.070
35	.043	.086	.097	.066
40	.035	.084	.119	.046
45	.035	.076	.118	.069
50	.034	.069	.094	----
55	.036	.064	.085	----
60	.039	.062	----	----
65	.028	.060	----	----
70	.007	.057	----	----
75	-.004	.039	----	----
80	-.035	----	----	----
85	-.093	----	----	----

TABLE 8.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION UP AT TIP, INBOARD SLAT, FENCES ON, AND $\delta_f = 40^o$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
	$C_{T,s} = 0.90$			$C_{T,s} = 0.80$		
5	0.621	-0.939	-0.119	0.769	-0.784	-0.137
10	.799	-.855	-.122	1.002	-.672	-.149
15	.968	-.754	-.124	1.199	-.545	-.152
20	1.113	-.631	-.132	1.401	-.387	-.172
25	1.229	-.498	-.139	1.552	-.212	-.178
30	1.339	-.350	-.141	1.659	-.038	-.184
35	1.418	-.189	-.149	1.680	.119	-.183
40	1.460	-.040	-.150	1.695	.266	-.174
45	1.499	.109	-.151	1.678	.381	-.145
50	1.476	.208	-.134	1.622	.444	-.103
55	1.414	.245	-.111	1.568	.527	-.074
60	1.377	.296	-.079	1.480	.566	-.040
65	1.343	.360	-.051	1.397	.587	.002
70	1.303	.434	-.025	1.267	.590	.026
75	1.266	.502	-.009			
80	1.233	.497	.086			
	$C_{T,s} = 0.60$			$C_{T,s} = 0.30$		
5	0.941	-0.485	-0.180	1.129	-0.087	-0.220
10	1.261	-.358	-.199	1.556	.077	-.260
15	1.593	-.178	-.232	1.948	.267	-.273
20	1.822	.009	-.231	2.218	.467	-.260
25	1.957	.172	-.215	2.344	.649	-.225
30	2.038	.347	-.182	2.326	.848	-.224
35	2.035	.502	-.162	2.014	.816	-.135
40	1.918	.604	-.129	1.607	.732	-.100
45	1.808	.685	-.078			
50	1.666	.751	-.074			
55	1.491	.750	-.035			
60	1.341	.761	-.009			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	0.036	0.054	0.078	0.104
10	.040	.066	.102	.132
15	.040	.070	.110	.129
20	.041	.073	.118	.127
25	.039	.085	.120	.126
30	.045	.089	.116	.097
35	.041	.091	.124	.059
40	.028	.077	.122	.008
45	.025	.069	.108	----
50	.020	.060	.090	----
55	.024	.064	.067	----
60	.016	.064	.072	----
65	.043	.052	----	----
70	.035	.042	----	----
75	.041	----	----	----
80	-.002	----	----	----

TABLE 9.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION UP AT TIP, INBOARD SLAT, FENCES ON, AND $\delta_f = 60^{\circ}$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
	$C_{T,s} = 0.90$			$C_{T,s} = 0.80$		
5	0.810	-0.795	-0.182	0.996	-0.607	-0.231
10	.966	-.692	-.186	1.197	-.471	-.242
15	1.090	-.567	-.193	1.374	-.325	-.236
20	1.214	-.425	-.204	1.498	-.175	-.236
25	1.304	-.300	-.195	1.653	.030	-.252
30	1.392	-.139	-.196	1.668	.173	-.246
35	1.439	.016	-.190	1.684	.321	-.235
40	1.459	.157	-.195	1.660	.433	-.214
45	1.453	.275	-.186	1.608	.505	-.174
50	1.423	.343	-.157	1.540	.552	-.123
55	1.341	.347	-.129	1.490	.603	-.088
60	1.298	.394	-.107	1.404	.621	-.049
65	1.252	.385	-.061			
70	1.238	.481	-.039			
75	1.199	.533	-.019			
	$C_{T,s} = 0.60$			$C_{T,s} = 0.30$		
5	1.219	-0.306	-0.257	1.421	0.106	-0.290
10	1.498	-.148	-.280	1.850	.307	-.319
15	1.805	.068	-.297	2.241	.542	-.343
20	1.970	.262	-.297	2.435	.767	-.350
25	2.095	.450	-.282	2.407	.934	-.316
30	2.097	.567	-.237	2.309	1.006	-.222
35	2.006	.647	-.172			
40	1.823	.696	-.128			
45	1.695	.742	-.088			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	0.043	0.064	0.100	0.133
10	.044	.073	.114	.154
15	.058	.082	.127	.156
20	.063	.088	.133	.145
25	.059	.093	.136	.118
30	.057	.103	.132	.087
35	.050	.084	.125	----
40	.040	.075	.115	----
45	.030	.065	.094	----
50	.019	.058	----	----
55	.021	.062	----	----
60	.015	.059	----	----
65	0	----	----	----
70	.054	----	----	----
75	.046	----	----	----

TABLE 10.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION UP AT TIP, FULL SPAN SLAT, FENCES ON, AND $\delta_f = 20^{\circ}$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
	$C_{T,s} = 0.90$			$C_{T,s} = 0.80$		
5	0.483	-1.006	-0.067	0.564	-0.870	-0.081
10	.651	-.949	-.066	.772	-.804	-.085
15	.810	-.870	-.070	.987	-.706	-.081
20	.968	-.768	-.065	1.195	-.573	-.097
25	1.109	-.651	-.076	1.369	-.434	-.099
30	1.211	-.527	-.079	1.498	-.272	-.102
35	1.295	-.395	-.089	1.574	-.106	-.107
40	1.386	-.240	-.082	1.610	.053	-.110
45	1.424	-.104	-.077	1.622	.184	-.097
50	1.437	.022	-.081	1.620	.308	-.074
55	1.418	.113	-.064	1.589	.416	-.047
60	1.383	.192	-.044	1.519	.480	-.028
65	1.361	.282	-.024	1.451	.540	.005
70	1.332	.359	-.005	1.374	.589	.033
75	1.298	.430	.033	1.311	.641	.065
80	1.279	.495	.107			
85	1.250	.520	.140			
	$C_{T,s} = 0.60$			$C_{T,s} = 0.30$		
5	0.633	-0.616	-0.104	0.694	-0.214	-0.126
10	.954	-.521	-.126	1.110	-.101	-.172
15	1.276	-.383	-.136	1.505	.047	-.176
20	1.530	-.226	-.151	1.834	.210	-.166
25	1.716	-.067	-.121	2.064	.390	-.152
30	1.867	.108	-.115	2.169	.575	-.150
35	1.945	.272	-.099	2.099	.692	-.133
40	1.922	.440	-.089	2.054	.825	-.101
45	1.910	.579	-.073	1.928	.927	-.082
50	1.850	.683	-.041			
55	1.773	.759	-.008			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	0.037	0.050	0.066	0.055
10	.034	.057	.085	.100
15	.035	.060	.088	.081
20	.033	.066	.091	.087
25	.035	.070	.089	.089
30	.051	.077	.093	.083
35	.043	.095	.104	.073
40	.032	.082	.124	.081
45	.032	.070	.126	.089
50	.031	.068	.109	----
55	.032	.068	.102	----
60	.034	.072	----	----
65	.024	.067	----	----
70	.011	.061	----	----
75	-.005	.042	----	----
80	-.037	----	----	----
85	-.092	----	----	----

TABLE 11.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION UP AT TIP, FULL SPAN SLAT, FENCES ON, AND $\delta_f = 40^{\circ}$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
	$C_{T,s} = 0.90$			$C_{T,s} = 0.80$		
5	0.612	-0.940	-0.118	0.727	-0.777	-0.147
10	.784	-.855	-.132	.954	-.668	-.158
15	.953	-.748	-.129	1.176	-.544	-.161
20	1.099	-.625	-.134	1.375	-.392	-.175
25	1.212	-.503	-.144	1.535	-.209	-.189
30	1.330	-.347	-.151	1.632	-.040	-.194
35	1.403	-.197	-.150	1.670	.126	-.193
40	1.448	-.045	-.153	1.691	.269	-.179
45	1.482	.100	-.145	1.661	.361	-.147
50	1.465	.200	-.134	1.615	.449	-.114
55	1.399	.229	-.103	1.553	.520	-.070
60	1.358	.290	-.083	1.496	.582	-.046
65	1.332	.362	-.046	1.416	.608	-.002
70	1.298	.421	-.030			
75	1.256	.468	.018			
	$C_{T,s} = 0.60$			$C_{T,s} = 0.30$		
5	0.868	-0.494	-0.171	1.020	-0.096	-0.225
10	1.223	-.364	-.211	1.501	.068	-.272
15	1.549	-.180	-.241	1.911	.264	-.288
20	1.805	.003	-.235	2.182	.452	-.264
25	1.938	.175	-.222	2.299	.669	-.274
30	2.035	.349	-.193	2.390	.855	-.238
35	2.054	.496	-.172	2.379	.974	-.179
40	1.950	.620	-.142	2.233	1.050	-.131
45	1.904	.718	-.101			
50	1.833	.782	-.047			
55	1.721	.826	-.010			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	0.036	0.055	0.081	0.093
10	.042	.064	.098	.121
15	.043	.072	.107	.124
20	.046	.074	.114	.120
25	.047	.082	.114	.108
30	.047	.091	.124	.094
35	.040	.090	.119	.084
40	.033	.077	.131	.088
45	.028	.067	.115	----
50	.037	.062	.101	----
55	.024	.064	.081	----
60	.016	.066	----	----
65	.012	.064	----	----
70	.024	----	----	----
75	.001	----	----	----

TABLE 12.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION UP AT TIP, FULL SPAN SLAT, FENCES ON, AND $\delta_f = 60^o$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
		$C_{T,s} = 0.90$			$C_{T,s} = 0.80$	
5	0.790	-0.794	-0.183	0.946	-0.611	-0.220
10	.959	-.685	-.190	1.176	-.472	-.241
15	1.076	-.576	-.192	1.360	-.322	-.243
20	1.200	-.435	-.208	1.488	-.170	-.232
25	1.306	-.294	-.201	1.601	.001	-.251
30	1.376	-.145	-.198	1.665	.175	-.246
35	1.418	.003	-.193	1.653	.301	-.235
40	1.444	.136	-.195	1.628	.418	-.205
45	1.456	.271	-.190	1.574	.485	-.160
50	1.399	.316	-.163	1.534	.540	-.119
55	1.338	.329	-.121	1.479	.601	-.078
60	1.296	.382	-.100	1.427	.641	-.041
65	1.253	.391	-.067	1.346	.632	.003
70	1.225	.461	-.034			
75	1.194	.529	-.018			
		$C_{T,s} = 0.60$			$C_{T,s} = 0.30$	
5	1.148	-0.325	-0.247	1.319	0.083	-0.283
10	1.465	-.157	-.278	1.787	.292	-.334
15	1.788	.055	-.302	2.158	.537	-.415
20	1.981	.266	-.302	2.398	.766	-.337
25	2.039	.410	-.270	2.373	.923	-.305
30	2.059	.549	-.233	2.361	1.062	-.253
35	2.011	.649	-.185	2.262	1.079	-.179
40	1.883	.732	-.136	2.006	1.044	-.075
45	1.816	.768	-.080			
50	1.732	.787	-.031			
55	1.570	.810	.007			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	0.047	0.058	0.097	0.123
10	.049	.070	.115	.144
15	.062	.087	.127	.154
20	.068	.089	.134	.147
25	.066	.090	.140	.112
30	.064	.103	.132	.099
35	.055	.082	.126	.078
40	.043	.071	.119	.080
45	.032	.061	.103	----
50	.017	.065	.089	----
55	.021	.065	.065	----
60	.054	.060	----	----
65	.041	.062	----	----
70	.038	----	----	----
75	.049	----	----	----

TABLE 13.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION DOWN AT TIP, BASIC LEADING EDGE, AND $\delta_f = 20^{\circ}$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
	$C_{T,s} = 0.90$			$C_{T,s} = 0.80$		
0	0.454	-1.083	-0.112	0.510	-0.946	-0.121
5	.605	-1.030	-.092	.701	-.885	-.107
10	.765	-.965	-.088	.905	-.806	-.103
15	.912	-.881	-.080	1.090	-.707	-.094
20	1.044	-.776	-.072	1.241	-.580	-.100
25	1.141	-.663	-.066	1.342	-.444	-.092
30	1.238	-.531	-.076	1.411	-.291	-.095
35	1.295	-.409	-.069	1.482	-.135	-.098
40	1.373	-.255	-.066	1.488	.009	-.088
45	1.392	-.136	-.065	1.480	.135	-.083
50	1.404	-.004	-.069	1.438	.229	-.058
55	1.395	.122	-.054	1.377	.296	-.042
60	1.364	.211	-.048	1.316	.363	-.013
65	1.328	.303	-.026	1.267	.434	.012
70	1.284	.377	.002	1.216	.502	.036
75	1.226	.434	.030	1.164	.558	.058
80	1.161	.471	.047			
85	1.148	.584	.045			
	$C_{T,s} = 0.60$			$C_{T,s} = 0.30$		
0	0.600	-0.666	-0.139	0.706	-0.283	-0.175
5	.862	-.593	-.128	1.011	-.201	-.161
10	1.133	-.504	-.124	1.343	-.094	-.154
15	1.374	-.382	-.111	1.647	.036	-.152
20	1.539	-.239	-.128	1.854	.208	-.159
25	1.615	-.074	-.119	1.932	.385	-.156
30	1.598	.096	-.131	1.578	.473	-.175
35	1.537	.231	-.135	1.442	.567	-.146
40	1.509	.363	-.127	1.368	.679	-.147
45	1.447	.452	-.097			
50	1.387	.526	-.082			
55	1.309	.593	-.060			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
0	-0.004	0.021	0.042	0.057
5	-.006	.019	.047	.045
10	-.008	.020	.050	.048
15	-.009	.027	.060	.063
20	0	.040	.073	.079
25	.007	.046	.069	.051
30	.006	.060	.079	.031
35	.008	.066	.082	.055
40	.013	.073	.083	.123
45	.016	.076	.079	----
50	.020	.072	.070	----
55	.030	.061	.075	----
60	.026	.048	----	----
65	.021	.046	----	----
70	.013	.050	----	----
75	.009	.055	----	----
80	.029	----	----	----
85	-.004	----	----	----

TABLE 14.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION DOWN AT TIP, BASIC LEADING EDGE, AND $\delta_f = 40^{\circ}$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
	$C_{T,s} = 0.90$			$C_{T,s} = 0.80$		
0	0.661	-0.983	-0.169	0.753	-0.844	-0.189
5	.819	-.912	-.162	.953	-.759	-.176
10	.954	-.828	-.154	1.147	-.663	-.179
15	1.086	-.720	-.148	1.312	-.539	-.179
20	1.215	-.605	-.155	1.442	-.397	-.163
25	1.290	-.481	-.150	1.493	-.252	-.158
30	1.354	-.346	-.138	1.528	-.106	-.169
35	1.384	-.227	-.130	1.547	.039	-.154
40	1.420	-.083	-.119	1.515	.166	-.135
45	1.419	.035	-.124	1.471	.260	-.127
50	1.402	.144	-.105	1.398	.316	-.084
55	1.370	.244	-.099	1.342	.387	-.056
60	1.326	.328	-.077	1.280	.449	-.040
65	1.270	.373	-.049	1.228	.507	-.003
70	1.222	.423	-.013	1.162	.531	.020
75	1.167	.475	.002			
80	1.089	.564	.007			
	$C_{T,s} = 0.60$			$C_{T,s} = 0.30$		
0	0.903	-0.542	-0.213	1.022	-0.141	-0.254
5	1.164	-.445	-.215	1.366	-.040	-.251
10	1.431	-.330	-.218	1.693	.103	-.267
15	1.636	-.179	-.207	1.979	.281	-.269
20	1.785	-.014	-.213	2.152	.470	-.259
25	1.759	.140	-.207	1.858	.544	-.256
30	1.636	.269	-.201	1.541	.580	-.211
35	1.540	.372	-.117	1.389	.644	-.173
40	1.476	.460	-.143			
45	1.406	.540	-.113			
50	1.327	.588	-.079			
55	1.254	.631	-.057			
60	1.163	.633	-.021			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
0	-0.020	0.017	0.057	0.090
5	-.021	.015	.072	.085
10	-.010	.019	.074	.084
15	-.012	.031	.088	.100
20	-.008	.047	.090	.105
25	-.004	.057	.083	.051
30	-.006	.071	.082	.032
35	.004	.076	.074	.035
40	.009	.076	.072	----
45	.014	.069	.063	----
50	.022	.060	.068	----
55	.023	.040	.066	----
60	.023	.028	.070	----
65	.008	.032	----	----
70	-.007	.045	----	----
75	-.015	----	----	----
80	.036	----	----	----

TABLE 15.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION DOWN AT TIP, BASIC LEADING EDGE, AND $\delta_f = 60^o$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
		$C_{T,s} = 0.90$			$C_{T,s} = 0.80$	
0	0.856	-0.830	-0.233	1.091	-0.710	-0.268
5	1.009	-.732	-.242	1.257	-.601	-.268
10	1.135	-.626	-.239	1.411	-.472	-.257
15	1.243	-.505	-.236	1.562	-.330	-.259
20	1.326	-.384	-.226	1.608	-.192	-.241
25	1.369	-.261	-.215	1.616	.053	-.235
30	1.393	-.138	-.210	1.597	.170	-.216
35	1.414	-.003	-.197	1.562	.279	-.179
40	1.421	.123	-.189	1.490	.357	-.153
45	1.394	.233	-.179	1.407	.405	-.122
50	1.351	.319	-.157	1.342	.473	-.104
55	1.294	.377	-.148	1.273	.525	-.080
60	1.243	.406	-.104	1.218	.568	-.051
65	1.181	.439	-.065	1.174	.594	-.010
70	1.135	.477	-.047			
		$C_{T,s} = 0.60$			$C_{T,s} = 0.30$	
0	1.251	-0.396	-0.315	1.415	0.058	-0.342
5	1.490	-.266	-.335	1.737	.200	-.339
10	1.695	-.127	-.325	2.056	.384	-.355
15	1.860	.140	-.329	2.229	.564	-.341
20	1.903	.306	-.296	2.343	.727	-.315
25	1.692	.388	-.259	1.727	.631	-.213
30	1.548	.464	-.221	1.440	.660	-.174
35	1.451	.525	-.188	1.283	.714	-.157
40	1.427	.617	-.169	1.205	.802	-.136
45	1.350	.728	-.130			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
0	-0.026	0.025	0.151	0.141
5	-.014	.034	.161	.140
10	-.009	.042	.162	.162
15	-.010	.053	.164	.135
20	-.013	.055	.156	.120
25	0	.069	.130	.032
30	.003	.074	.113	.021
35	.010	.070	.100	.010
40	.014	.057	.099	.005
45	.027	.038	.084	----
50	.020	.027	----	----
55	.012	.006	----	----
60	-.015	.010	----	----
65	-.033	.019	----	----
70	-.041	----	----	----

TABLE 16.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION DOWN AT TIP, INBOARD SLAT, AND $\delta_f = 20^{\circ}$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
		$C_{T,s} = 0.90$			$C_{T,s} = 0.80$	
5	0.598	-1.015	-0.102	0.685	-0.884	-0.111
10	.753	-.947	-.091	.885	-.806	-.104
15	.895	-.869	-.081	1.084	-.704	-.096
20	1.032	-.766	-.073	1.240	-.579	-.095
25	1.144	-.663	-.072	1.373	-.452	-.083
30	1.226	-.539	-.089	1.469	-.314	-.076
35	1.281	-.409	-.081	1.501	-.162	-.081
40	1.323	-.273	-.074	1.497	-.010	-.088
45	1.349	-.161	-.067	1.509	.125	-.072
50	1.363	-.034	-.058	1.508	.243	-.046
55	1.340	.056	-.049	1.450	.311	-.018
60	1.334	.157	-.030	1.381	.388	.016
65	1.324	.271	-.003	1.259	.514	.063
70	1.283	.352	.017	1.210	.587	.076
75	1.239	.407	.037			
80	1.193	.476	.053			
85	1.143	.550	.060			
		$C_{T,s} = 0.60$			$C_{T,s} = 0.30$	
5	0.783	-0.602	-0.137	0.890	-0.200	-0.169
10	1.051	-.505	-.132	1.223	-.097	-.166
15	1.320	-.387	-.121	1.565	.030	-.148
20	1.548	-.250	-.114	1.860	.198	-.148
25	1.694	-.094	-.102	2.055	.360	-.123
30	1.818	.075	-.093	1.932	.497	-.154
35	1.835	.235	-.083	1.909	.626	-.130
40	1.718	.352	-.096	1.785	.708	-.103
45	1.600	.439	-.072	1.564	.733	-.064
50	1.531	.535	-.040			
55	1.456	.600	-.014			
60	1.392	.676	.014			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	0.010	0.089	0.068	0.081
10	.002	.086	.062	.079
15	.011	.081	.057	.056
20	.002	.087	.064	.048
25	.013	.100	.079	.061
30	.014	.108	.082	.047
35	.015	.110	.077	.030
40	.014	.120	.058	.022
45	.011	.122	.073	----
50	.016	.120	.061	----
55	.013	.114	.057	----
60	.016	.094	.044	----
65	.015	.080	----	----
70	.008	.082	----	----
75	0	.089	----	----
80	-.008	----	----	----
85	-.015	----	----	----

TABLE 17.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION DOWN AT TIP, INBOARD SLAT, AND $\delta_f = 40^{\circ}$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
		$C_{T,s} = 0.90$			$C_{T,s} = 0.80$	
5	0.792	-0.913	-0.176	0.923	-0.754	-0.183
10	.941	-.823	-.168	1.120	-.651	-.183
15	1.071	-.724	-.154	1.285	-.529	-.177
20	1.182	-.609	-.154	1.429	-.394	-.167
25	1.274	-.487	-.150	1.515	-.253	-.152
30	1.328	-.368	-.141	1.566	-.120	-.149
35	1.348	-.240	-.135	1.547	.028	-.150
40	1.353	-.121	-.131	1.516	.147	-.134
45	1.355	-.009	-.122	1.510	.252	-.104
50	1.341	.081	-.110	1.458	.327	-.071
55	1.327	.174	-.096	1.392	.390	-.032
60	1.325	.295	-.064	1.335	.463	-.006
65	1.283	.364	-.046	1.274	.534	.009
70	1.227	.410	-.016	1.208	.579	.037
75	1.183	.461	-.001			
80	1.136	.565	.004			
		$C_{T,s} = 0.60$			$C_{T,s} = 0.30$	
5	1.086	-0.462	-0.216	1.253	-0.049	-0.255
10	1.365	-.338	-.215	1.602	.081	-.263
15	1.601	-.192	-.212	1.942	.252	-.255
20	1.815	-.021	-.200	2.201	.447	-.248
25	1.925	.149	-.197	2.287	.611	-.222
30	1.970	.306	-.193	2.067	.676	-.174
35	1.887	.419	-.144	1.953	.768	-.152
40	1.645	.448	-.124	1.826	.800	-.101
45	1.554	.547	-.091			
50	1.485	.622	-.064			
55	1.402	.672	-.024			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	-0.004	0.030	0.079	0.111
10	-.003	.028	.077	.099
15	-.003	.031	.074	.089
20	.001	.041	.078	.087
25	.008	.061	.099	.089
30	.008	.062	.093	.053
35	.011	.069	.075	.040
40	.003	.069	.049	.022
45	.008	.064	.052	----
50	.011	.062	.046	----
55	.008	.041	.042	----
60	.010	.023	----	----
65	-.004	.011	----	----
70	-.006	.004	----	----
75	-.018	----	----	----
80	-.030	----	----	----

TABLE 18.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION DOWN AT TIP, INBOARD SLAT, AND $\delta_f = 60^{\circ}$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
		$C_{T,s} = 0.90$			$C_{T,s} = 0.80$	
5	0.968	-0.741	-0.232	1.136	-0.567	-0.247
10	1.100	-.633	-.225	1.303	-.437	-.249
15	1.210	-.524	-.230	1.434	-.307	-.242
20	1.288	-.402	-.216	1.546	-.157	-.245
25	1.367	-.266	-.208	1.619	.003	-.240
30	1.364	-.155	-.208	1.598	.108	-.211
35	1.351	-.043	-.201	1.462	.172	-.179
40	1.324	.055	-.188	1.421	.249	-.150
45	1.298	.131	-.170	1.382	.319	-.108
50	1.272	.208	-.144	1.300	.366	-.079
55	1.264	.303	-.124	1.275	.463	-.062
60	1.209	.339	-.098	1.230	.542	-.040
65	1.168	.382	-.081	1.184	.600	-----
70	1.128	.433	-.034			
		$C_{T,s} = 0.60$			$C_{T,s} = 0.30$	
5	1.392	-0.260	-0.296	1.613	0.174	-0.339
10	1.631	-.099	-.294	1.891	.326	-.313
15	1.837	.067	-.287	2.146	.508	-.306
20	1.963	.251	-.274	2.345	.731	-.299
25	2.032	.415	-.263	2.321	.834	-.245
30	2.012	.534	-.220	2.097	.827	-.157
35	1.801	.525	-.148	1.952	.866	-.111
40	1.546	.562	-.131			
45	1.500	.636	-.024			
50	1.399	.681	-.050			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	-----	0.034	0.089	0.149
10	-0.005	.041	.084	.120
15	.003	.048	.089	.101
20	.012	.057	.095	.092
25	.016	.067	.102	.094
30	.018	.069	.091	.049
35	.014	.056	.068	.040
40	.012	.040	.032	
45	.002	.036	.030	
50	-.006	.017	.023	
55	-.018	.004	----	
60	-.017	-.004	----	
65	-.017	.009	----	
70	-.020	----	----	

TABLE 19.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION DOWN AT TIP, INBOARD SLAT, FENCES ON, AND $\delta_f = 20^o$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
	$C_{T,s} = 0.90$			$C_{T,s} = 0.80$		
5	0.620	-1.019	-0.106	0.694	-0.864	-0.123
10	.772	-.949	-.095	.900	-.787	-.105
15	.923	-.863	-.092	1.086	-.687	-.100
20	1.059	-.761	-.086	1.262	-.568	-.095
25	1.177	-.648	-.085	1.399	-.426	-.085
30	1.299	-.507	-.089	1.509	-.277	-.083
35	1.369	-.371	-.086	1.507	-.125	-.095
40	1.425	-.217	-.089	1.504	.005	-.086
45	1.468	-.074	-.085	1.453	.084	-.074
50	1.484	.066	-.078	1.411	.158	-.035
55	1.477	.201	-.062	1.375	.272	-.022
60	1.440	.300	-.047	1.428	.453	.005
65	1.382	.376	-.014	1.341	.484	.046
70	1.312	.408	.010	1.287	.559	.103
75	1.274	.497	.036	1.230	.613	.134
80	1.215	.538	.058			
85	1.162	.607	.065			
	$C_{T,s} = 0.60$			$C_{T,s} = 0.30$		
5	0.800	-0.592	-0.136	0.885	-0.208	-0.170
10	1.085	-.500	-.134	1.251	-.094	-.186
15	1.354	-.384	-.120	1.603	.044	-.167
20	1.575	-.233	-.115	1.844	.223	-.168
25	1.743	-.067	-.101	1.863	.361	-.172
30	1.751	.090	-.108	1.831	.478	-.154
35	1.792	.229	-.106	1.662	.666	-.098
40	1.579	.277	-.089	1.531	.764	-.087
45	1.581	.435	-.082			
50	1.557	.549	-.056			
55	1.465	.619	-.024			
60	1.383	.686	.056			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	0.006	0.035	0.070	0.084
10	.008	.033	.072	.095
15	.007	.034	.075	.081
20	.004	.036	.077	.071
25	.008	.047	.086	.061
30	.017	.065	.080	.049
35	.021	.074	.080	.006
40	.024	.068	.051	.006
45	.026	.061	.060	.021
50	.037	.060	.052	----
55	.044	.050	.047	----
60	.034	.053	.037	----
65	.023	.032	----	----
70	.009	.029	----	----
75	.004	.040	----	----
80	0	----	----	----
85	-.015	----	----	----

TABLE 20.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION DOWN AT TIP, INBOARD SLAT, FENCES ON, AND $\delta_f = 40^o$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
		$C_{T,s} = 0.90$			$C_{T,s} = 0.80$	
5	0.810	-0.898	-0.171	0.943	-0.750	-0.194
10	.957	-.812	-.163	1.132	-.641	-.181
15	1.092	-.709	-.161	1.302	-.521	-.182
20	1.220	-.589	-.164	1.456	-.384	-.171
25	1.317	-.454	-.159	1.575	-.226	-.172
30	1.399	-.319	-.150	1.639	-.057	-.176
35	1.464	-.164	-.146	1.656	.101	-.174
40	1.476	-.025	-.141	1.670	.244	-.161
45	1.499	.107	-.131	1.658	.379	-.131
50	1.494	.239	-.121	1.589	.470	-.103
55	1.464	.352	-.105	1.545	.542	-.061
60	1.411	.438	-.080	1.381	.513	-.015
65	1.353	.508	-.060	1.315	.576	.011
70	1.256	.478	-.022			
75	1.221	.584	.004			
		$C_{T,s} = 0.60$			$C_{T,s} = 0.30$	
5	1.118	-0.444	-0.233	1.287	-0.049	-0.268
10	1.398	-.328	-.222	1.623	.093	-.268
15	1.637	-.175	-.226	1.962	.265	-.256
20	1.846	0	-.222	2.165	.483	-.275
25	1.963	.173	-.205	2.310	.677	-.250
30	1.831	.289	-.187	1.806	.605	-.170
35	1.683	.350	-.164	1.762	.694	-.146
40	1.536	.378	-.113	1.627	.735	-.087
45	1.582	.573	-.110			
50	1.518	.648	-.071			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	-0.010	0.026	0.084	0.119
10	-.006	.033	.080	.119
15	-.002	.033	.085	.109
20	-.002	.046	.094	.096
25	.006	.057	.108	.093
30	.013	.070	.087	.022
35	.019	.083	.052	.007
40	.020	.085	.045	.015
45	.024	.109	.046	----
50	.034	.084	.032	----
55	.038	.075	----	----
60	.026	.030	----	----
65	.006	.018	----	----
70	-.011	----	----	----
75	-.017	----	----	----

TABLE 21.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION DOWN AT TIP, INBOARD SLAT, FENCES ON, AND $\delta_f = 50^{\circ}$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
	$C_{T,s} = 0.90$			$C_{T,s} = 0.80$		
5	0.909	-0.816	-0.219	1.076	-0.642	-0.239
10	1.054	-.714	-.220	1.257	-.525	-.248
15	1.180	-.595	-.225	1.426	-.385	-.240
20	1.287	-.466	-.225	1.547	-.231	-.232
25	1.379	-.334	-.219	1.646	-.067	-.239
30	1.449	-.184	-.209	1.718	.110	-.236
35	1.505	-.023	-.208	1.690	.235	-.217
40	1.493	.099	-.196	1.672	.373	-.199
45	1.506	.242	-.180	1.628	.469	-.156
50	1.480	.356	-.167	1.545	.531	-.124
55	1.444	.464	-.151	1.435	.559	-.070
60	1.377	.533	-.131	1.337	.582	-.041
65	1.322	.594	-.092	1.262	.628	-.012
	$C_{T,s} = 0.60$			$C_{T,s} = 0.80$		
5	1.321	-0.340	-0.289	1.549	0.076	-0.327
10	1.614	-.179	-.294	1.923	.257	-.339
15	1.846	-.013	-.294	2.197	.455	-.332
20	1.987	.158	-.277	2.402	.641	-.320
25	2.098	.356	-.267	2.061	.662	-.227
30	1.878	.416	-.229	1.780	.664	-.177
35	1.805	.500	-.186	1.718	.729	-.130
40	1.525	.453	-.121	1.539	.745	-.085
45	1.548	.615	-.111			
50	1.482	.681	-.058			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	-0.021	0.025	0.087	0.147
10	-.021	.026	.089	.143
15	-.012	.036	.093	.138
20	-.004	.047	.106	.133
25	.007	.064	.121	.086
30	.013	.081	.091	.022
35	.017	.088	.082	.002
40	.019	.091	.034	-.018
45	.024	.090	.034	----
50	.026	.081	.027	----
55	.026	.059	----	----
60	.019	.024	----	----
65	-.006	.006	----	----

TABLE 22.- TABULATED AERODYNAMIC DATA FOR CONFIGURATION WITH PROPELLER ROTATION DOWN AT TIP, INBOARD SLAT, FENCES ON, AND $\delta_f = 60^{\circ}$

(a) Wing data

α, deg	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$	$C_{L,s}$	$C_{D,s}$	$C_{m,s}$
		$C_{T,s} = 0.90$			$C_{T,s} = 0.80$	
5	0.975	-0.728	-0.236	1.177	-0.551	-0.261
10	1.112	-.615	-.241	1.340	-.424	-.259
15	1.226	-.495	-.239	1.479	-.278	-.259
20	1.320	-.361	-.241	1.610	-.109	-.263
25	1.417	-.217	-.234	1.706	.053	-.264
30	1.452	-.078	-.226	1.731	.207	-.255
35	1.487	.067	-.226	1.681	.338	-.234
40	1.480	.196	-.212	1.653	.447	-.203
45	1.464	.322	-.189	1.620	.543	-.168
50	1.440	.427	-.174	1.499	.573	-.115
55	1.381	.506	-.155	1.377	.580	-.069
60	1.335	.580	-.131	1.278	.624	-.048
65	1.268	.612	-.093			
		$C_{T,s} = 0.60$			$C_{T,s} = 0.30$	
5	1.474	-0.230	-0.314	1.641	0.160	-0.338
10	1.709	-.076	-.304	1.944	.340	-.321
15	1.835	.076	-.286	2.173	.524	-.312
20	1.951	.249	-.269	2.027	.619	-.258
25	2.057	.435	-.265	2.013	.710	-.219
30	1.810	.462	-.200	1.715	.688	-.154
35	1.743	.544	-.170	1.644	.732	-.106
40	1.459	.482	-.096	1.426	.739	-.070
45	1.473	.624	-.082			

(b) Fuselage data

α, deg	$C_{L,s(fus)}$			
	$C_{T,s} = 0.90$	$C_{T,s} = 0.80$	$C_{T,s} = 0.60$	$C_{T,s} = 0.30$
5	-0.024	0.014	0.090	0.201
10	-.022	.022	.090	.201
15	-.006	.030	.098	.181
20	.008	.054	.104	.139
25	.019	.072	.119	.131
30	.018	.093	.082	.068
35	.015	.089	.073	-.064
40	.017	.089	.026	-.086
45	.019	.085	.022	----
50	.018	.078	----	----
55	.017	.027	----	----
60	.002	----	----	----
65	-.019	----	----	----

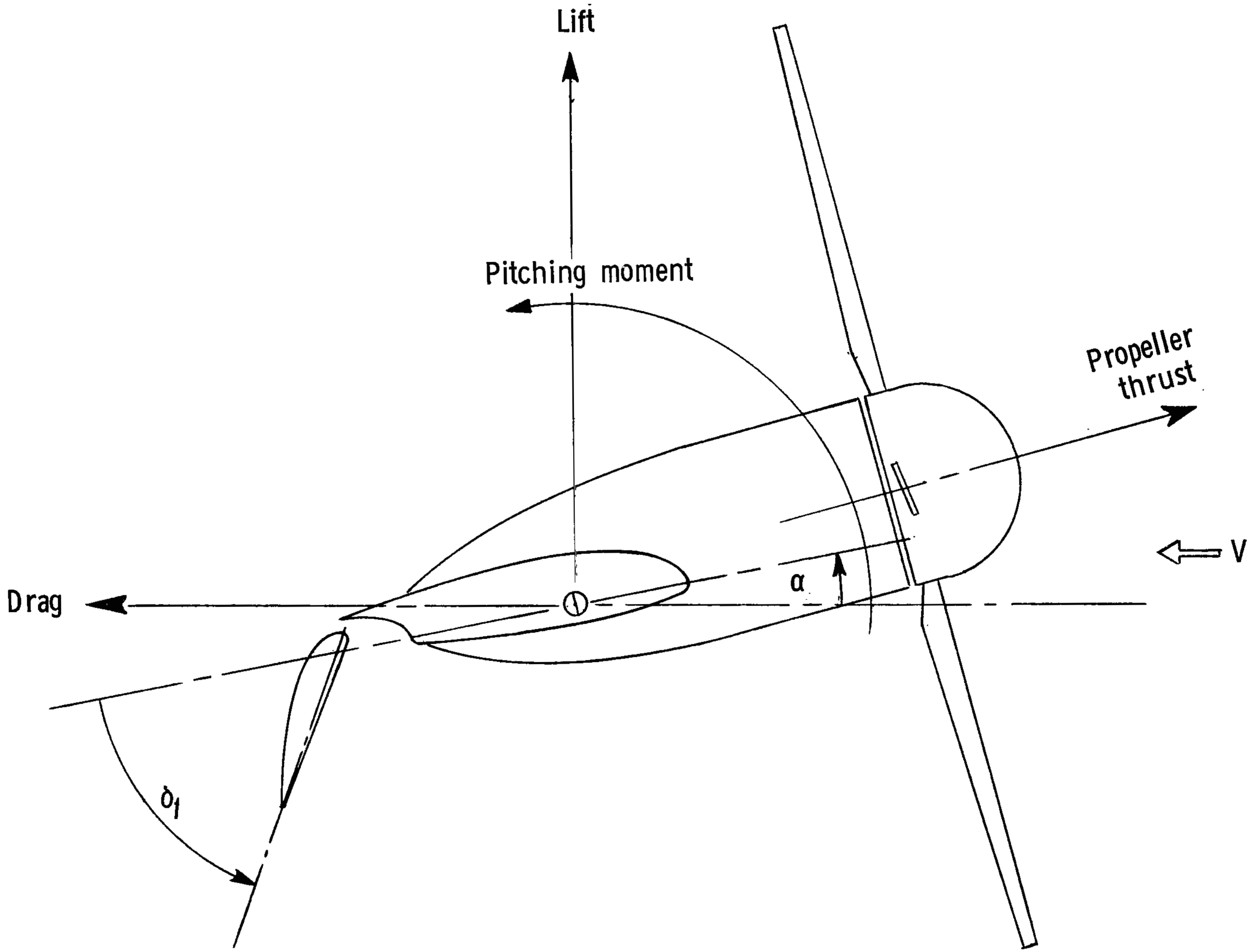
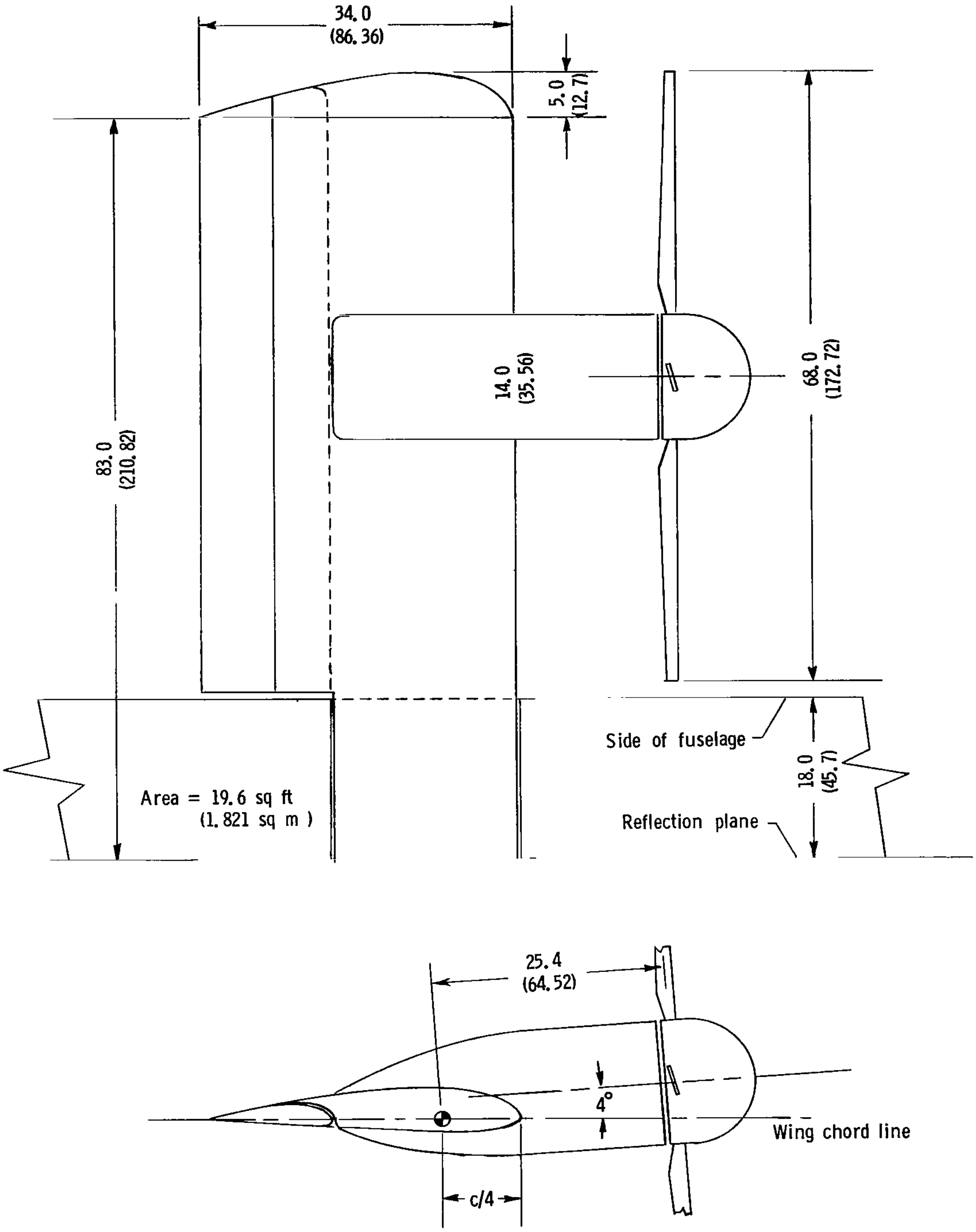
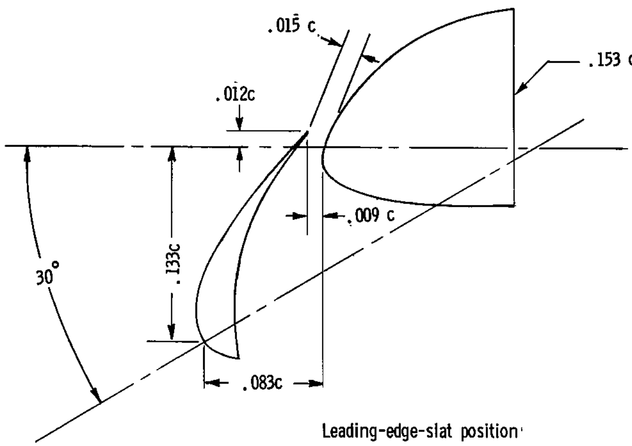


Figure 1.- The positive sense of forces, moments, and angles.

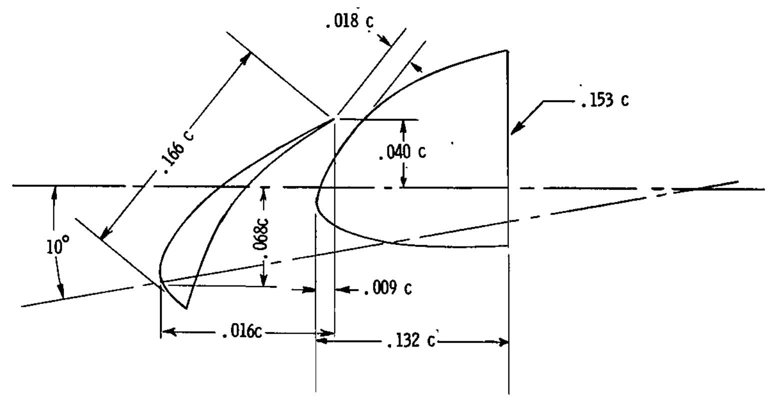


(a) Dimensions are given first in inches and parenthetically in centimeters.

Figure 2.- Principal dimensions of model and cross-sectional views of slat configuration, flap, and fences.



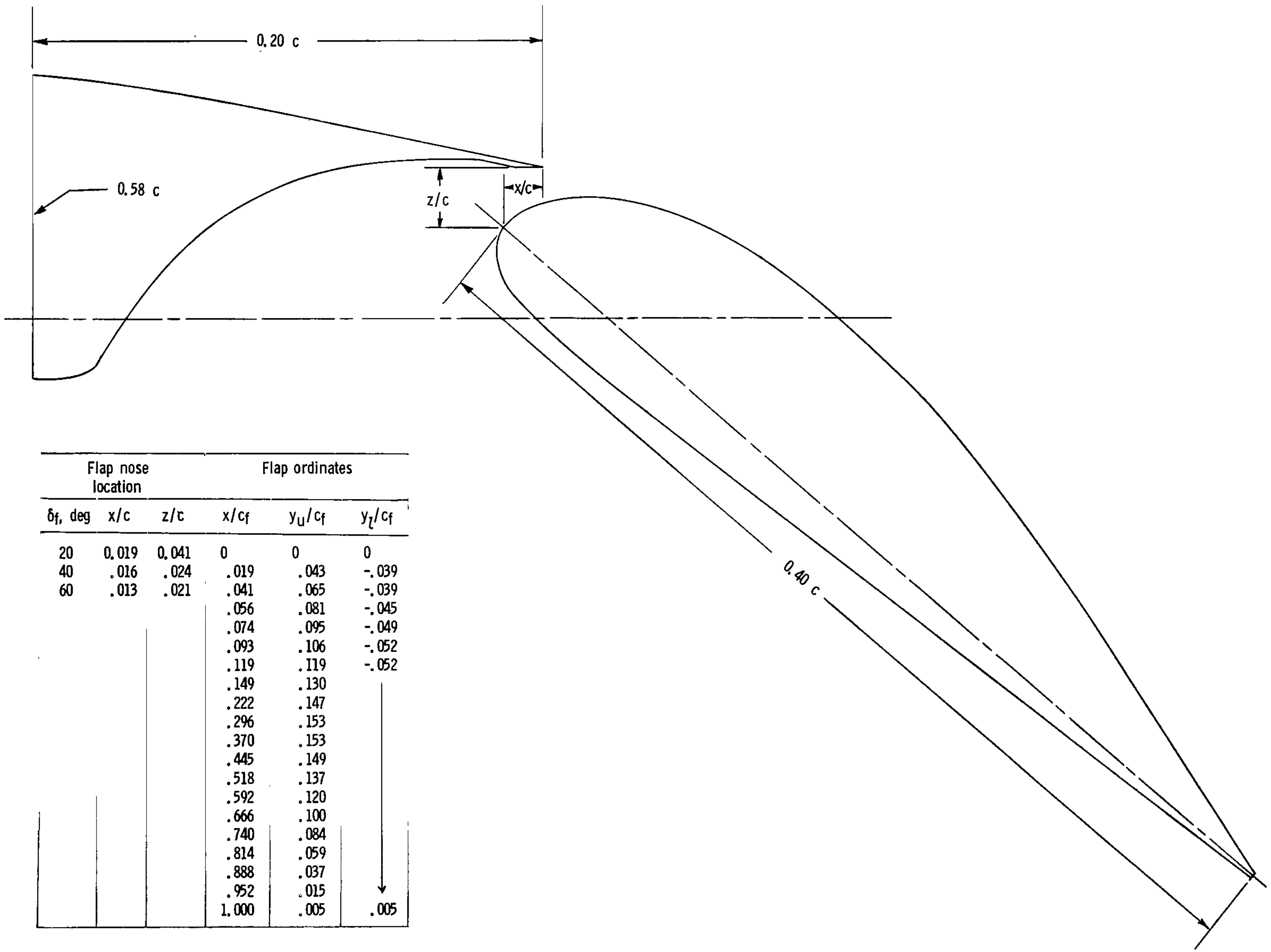
Leading-edge-slat position



Slat position over fuselage

(b) Sectional views of leading-edge-slat configuration.

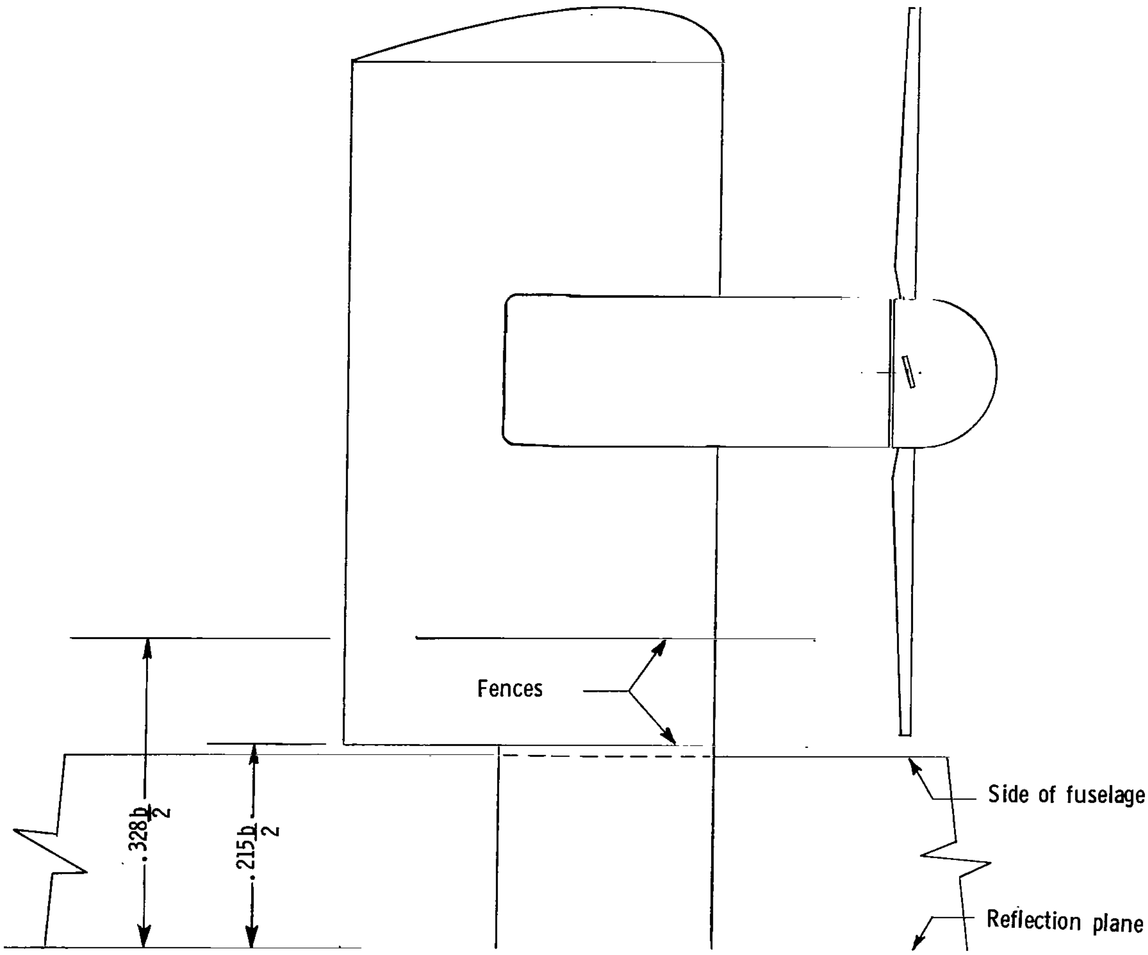
Figure 2.- Continued.

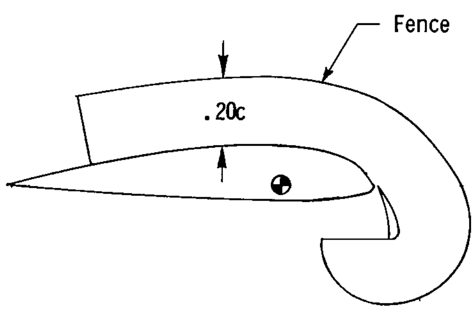


Flap nose location			Flap ordinates		
δ_f, deg	x/c	z/c	x/c_f	y_u/c_f	y_l/c_f
20	0.019	0.041	0	0	0
40	.016	.024	.019	.043	-.039
60	.013	.021	.041	.065	-.039
			.056	.081	-.045
			.074	.095	-.049
			.093	.106	-.052
			.119	.119	-.052
			.149	.130	
			.222	.147	
			.296	.153	
			.370	.153	
			.445	.149	
			.518	.137	
			.592	.120	
			.666	.100	
			.740	.084	
			.814	.059	
			.888	.037	
			.952	.015	
			1.000	.005	.005

(c) Sectional view of trailing-edge flap.

Figure 2.- Continued.





(d) Sectional view and location of fences.

Figure 2.- Concluded.

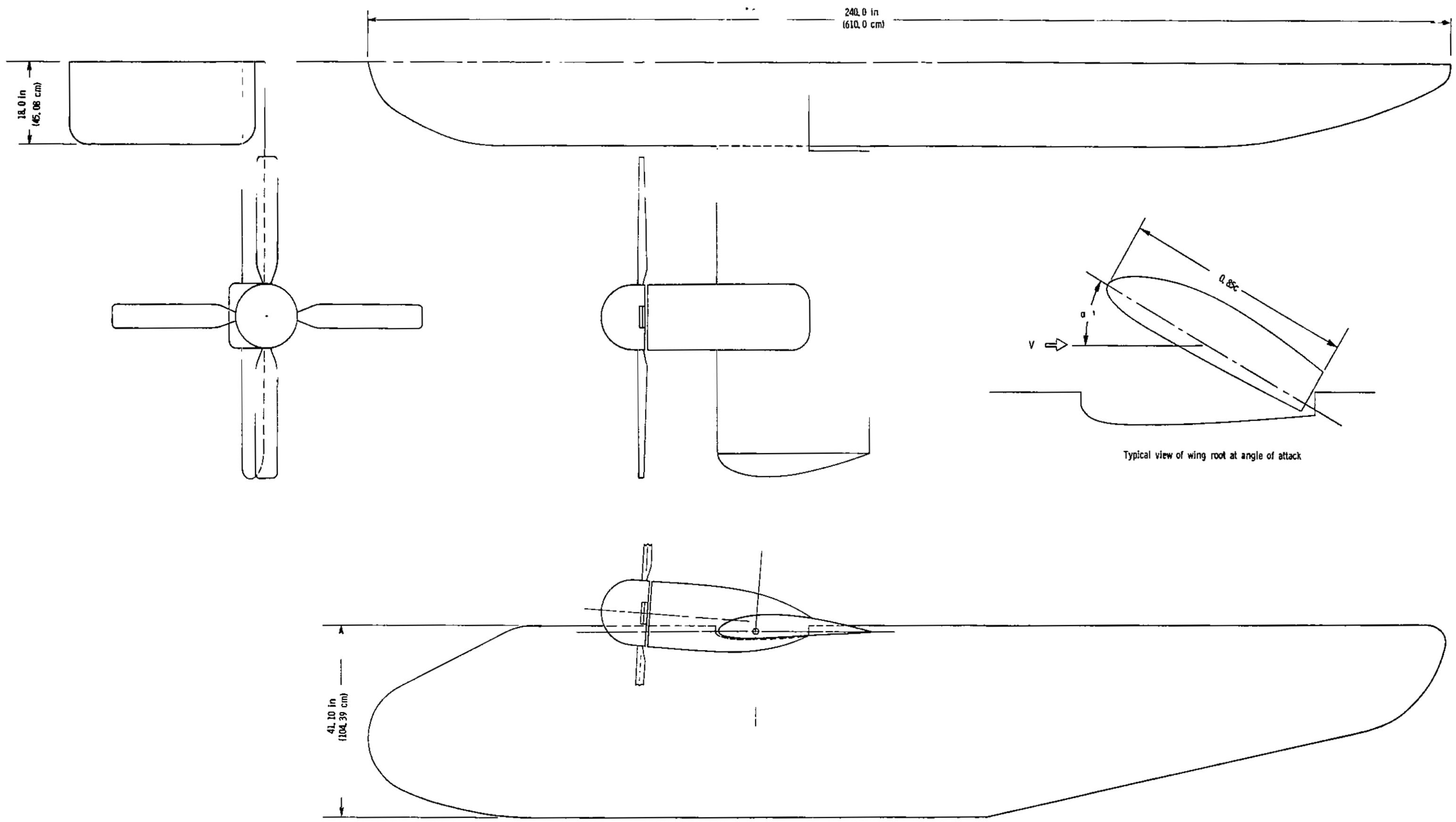


Figure 3.- Three-view drawing of the wing and fuselage.

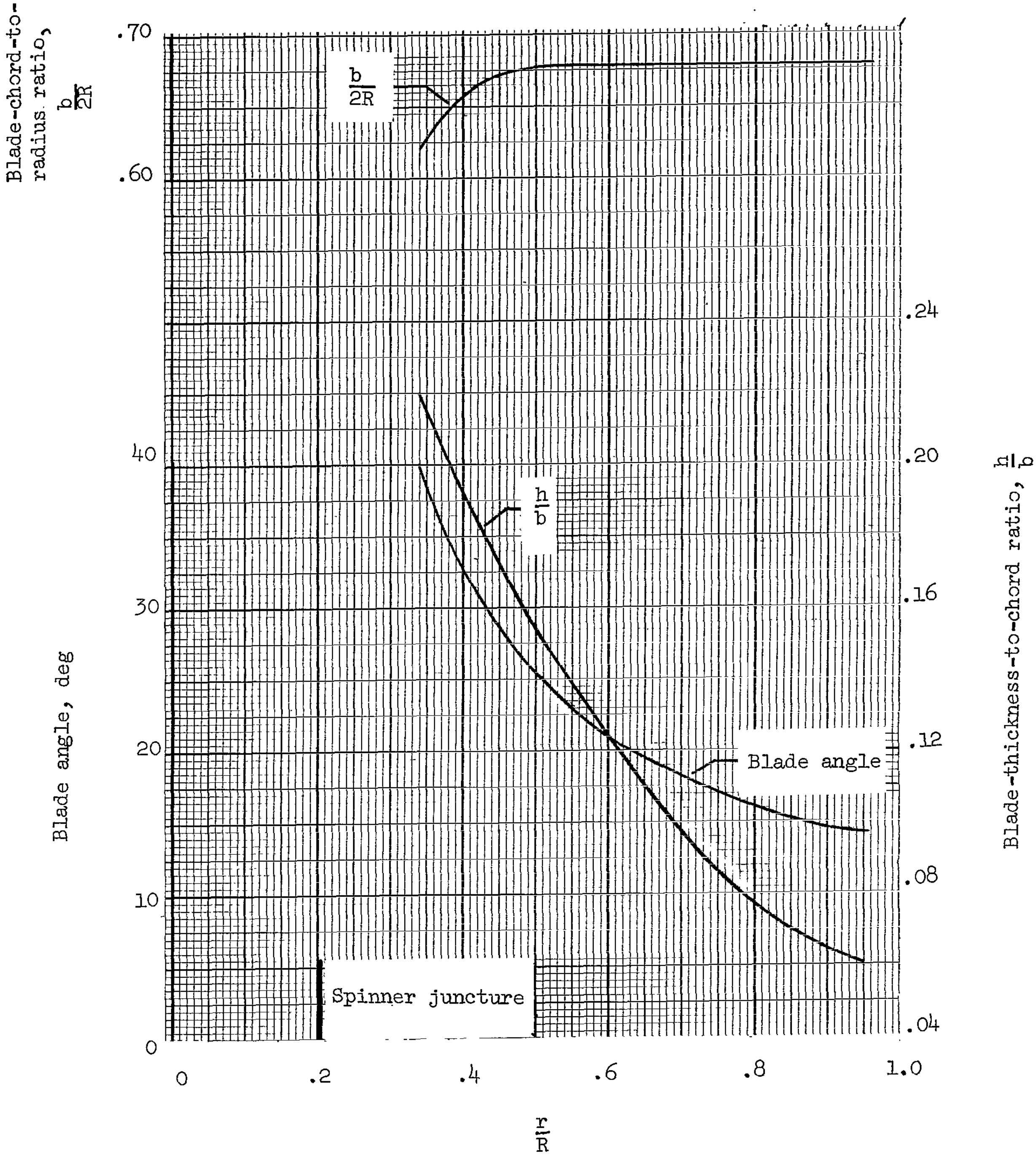
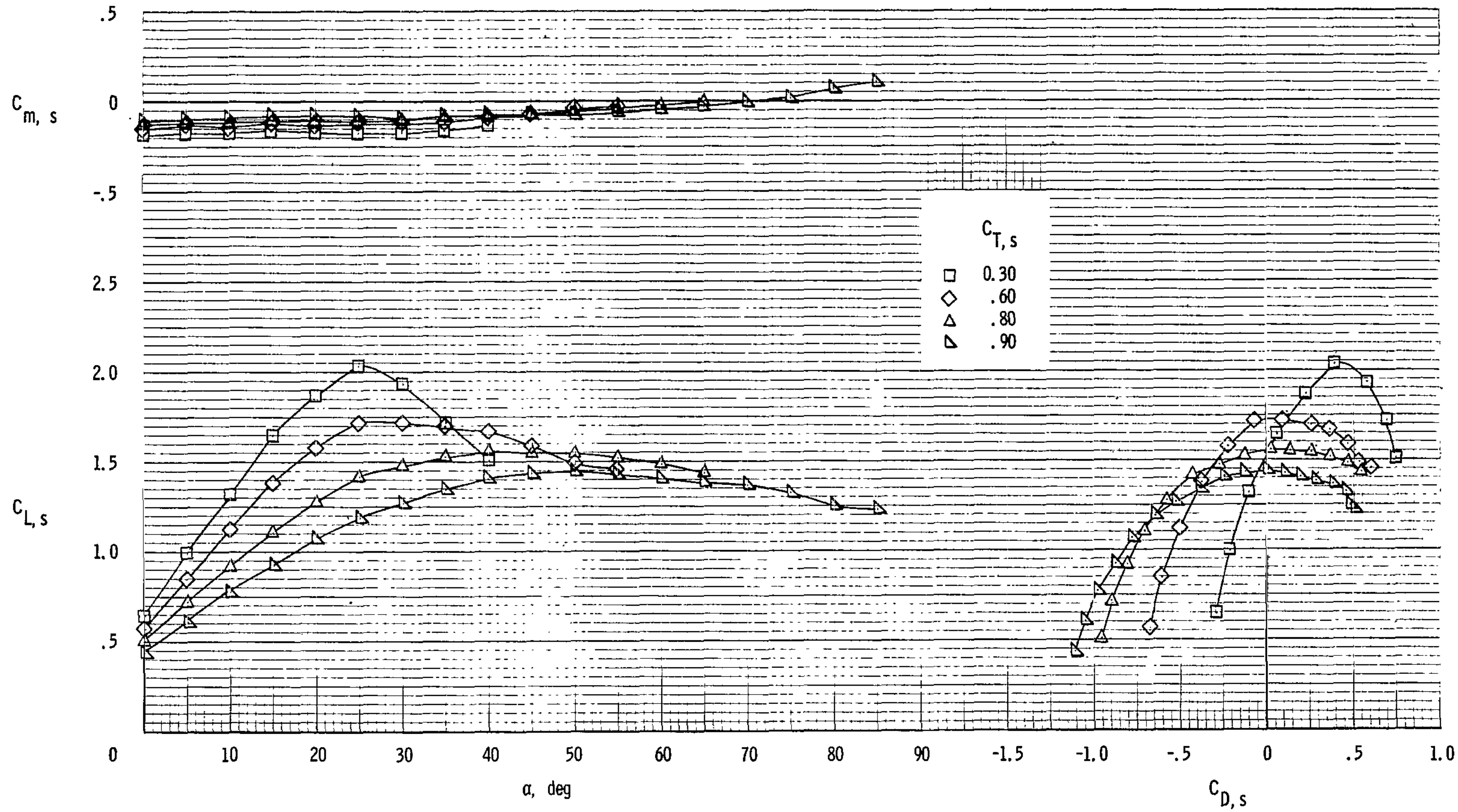
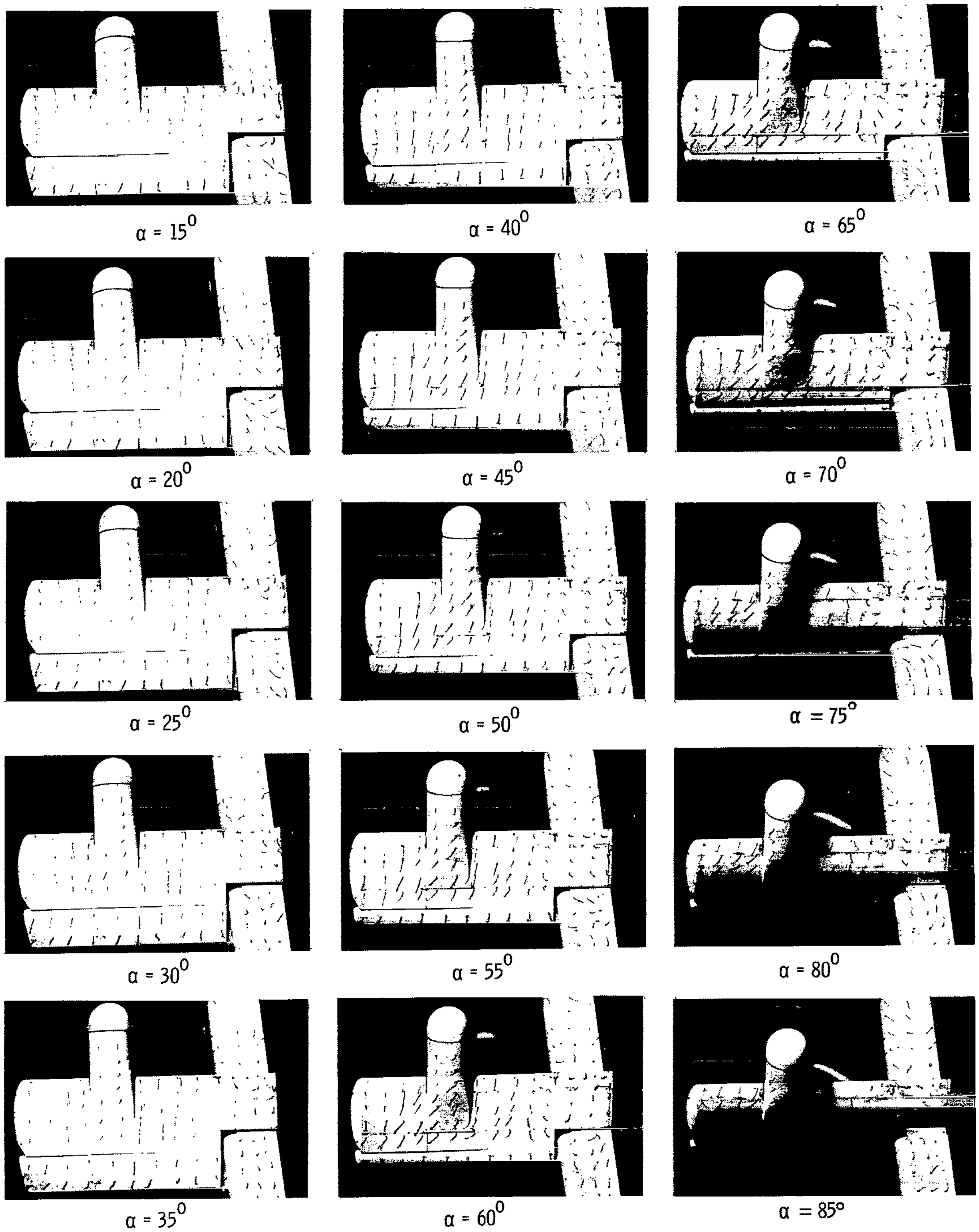


Figure 4.- Propeller blade form curves.



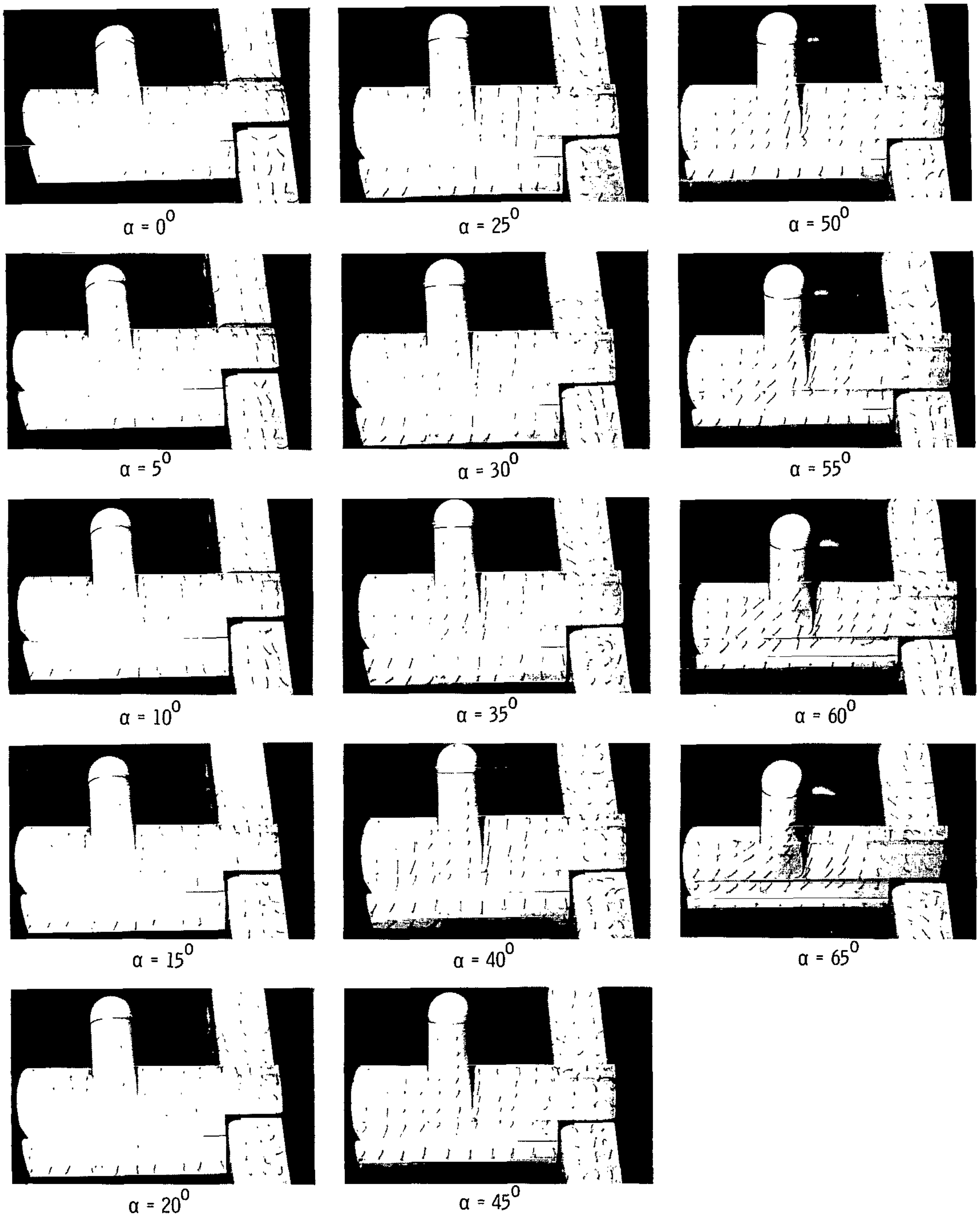
(a) Aerodynamic characteristics.

Figure 5.- Aerodynamic and flow characteristics of the wing with propeller rotation up at the tip. Basic leading edge; $\delta_f = 20^0$.



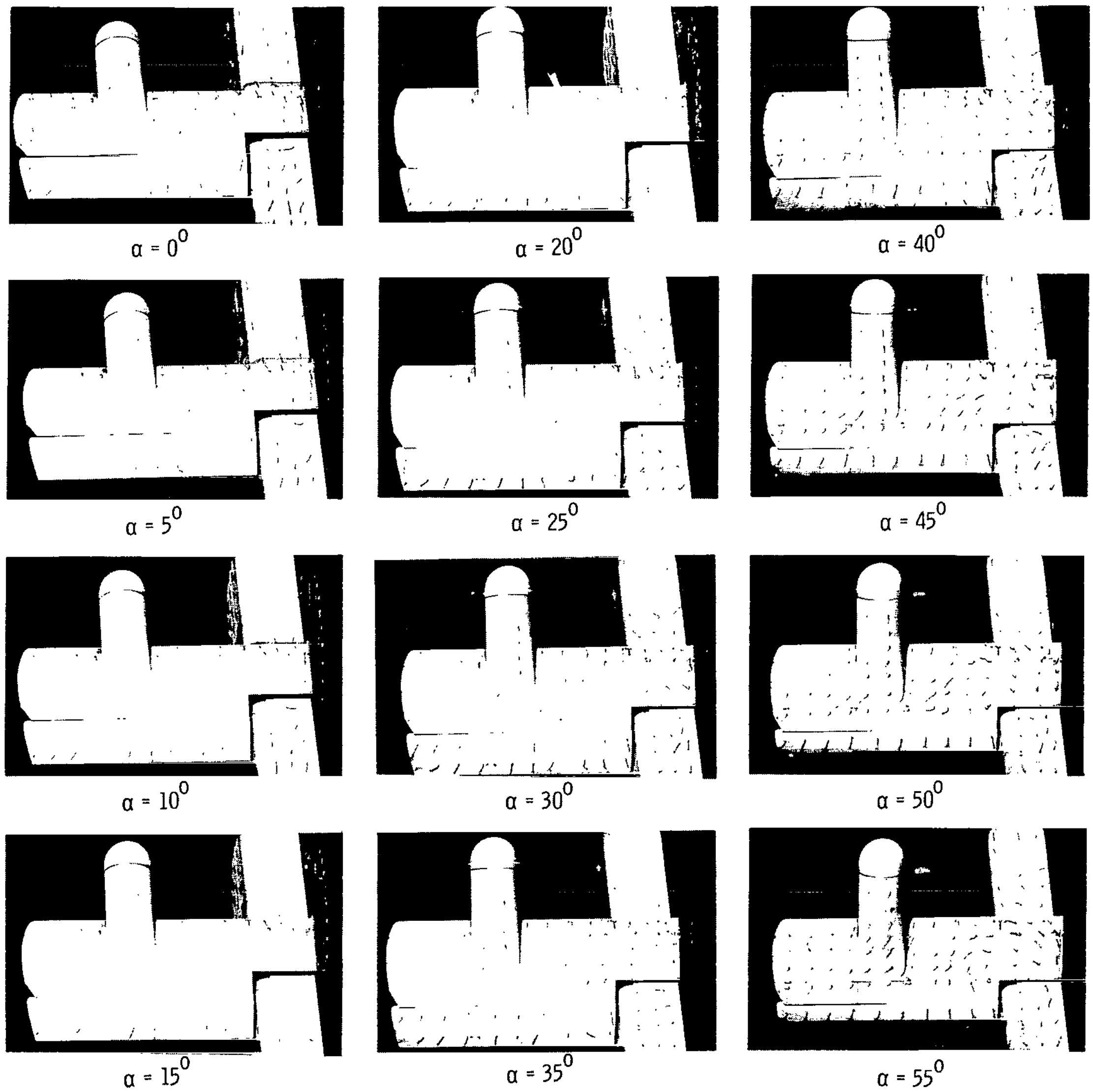
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 5.- Continued.



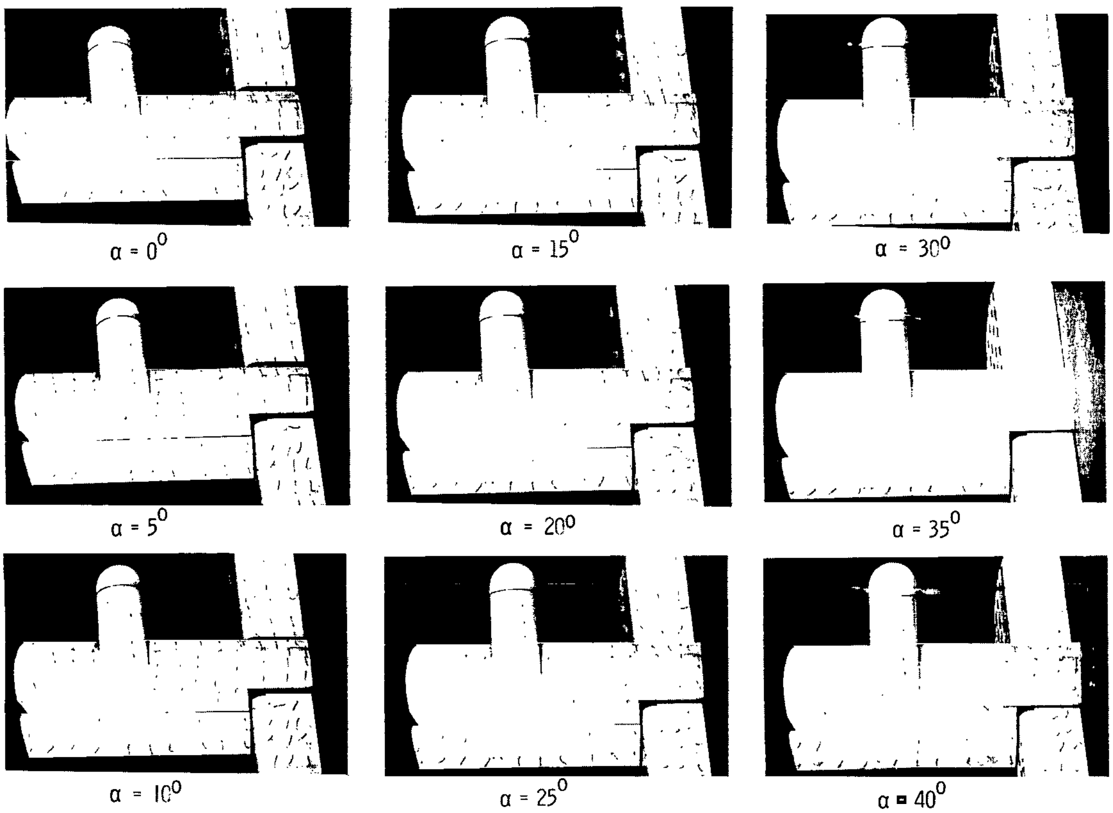
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 5.- Continued.



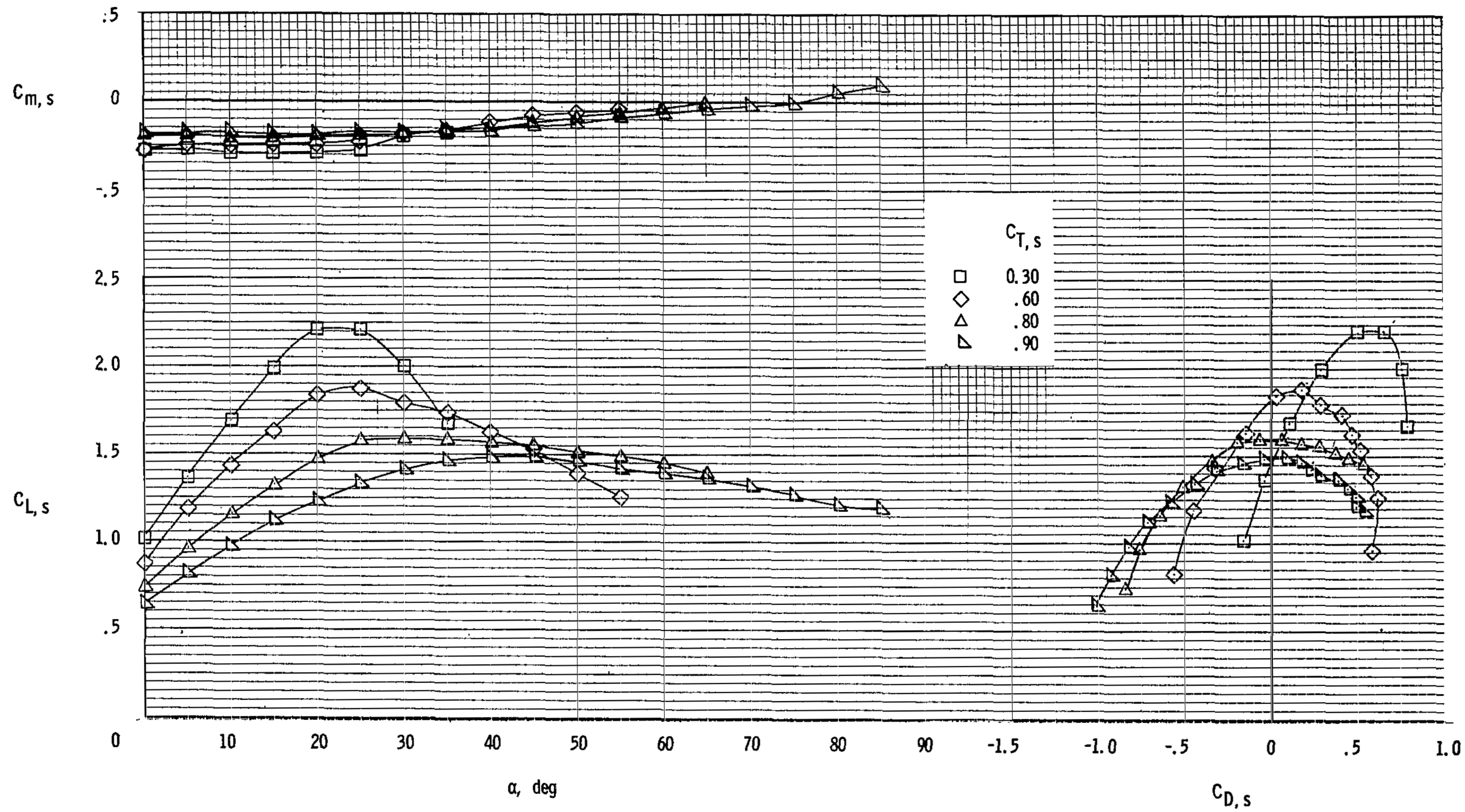
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 5.- Continued.



(e) Flow characteristics; $C_{T,s} = 0.30$.

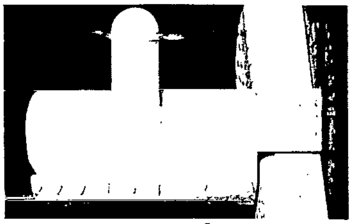
Figure 5.- Concluded.

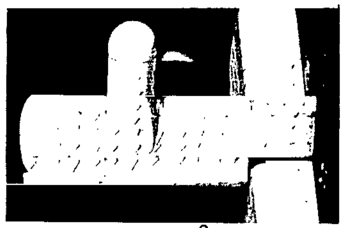


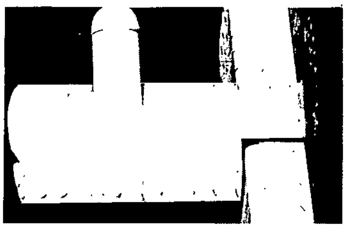
(a) Aerodynamic characteristics.

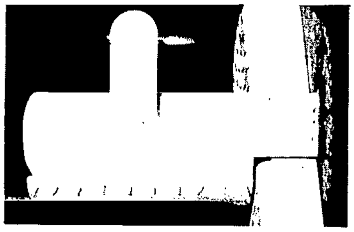
Figure 6.- Aerodynamic and flow characteristics of the wing with propeller rotation up at the tip. Basic leading edge; $\delta_f = 40^o$.

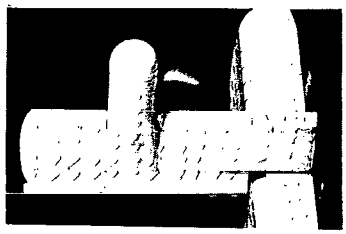

α = 15°

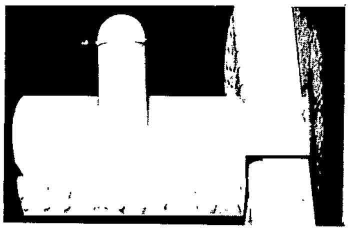

α = 40°

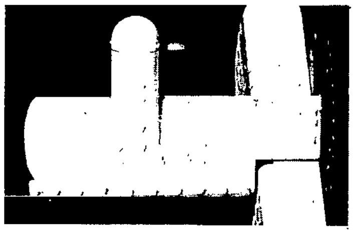

α = 65°

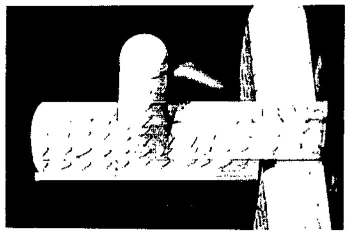

α = 20°


α = 45°

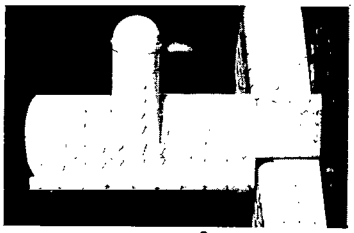

α = 70°

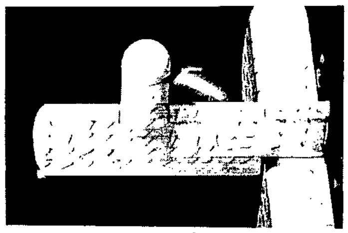

α = 25°


α = 50°

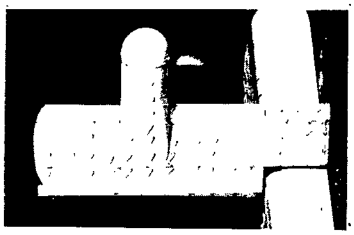

α = 75°

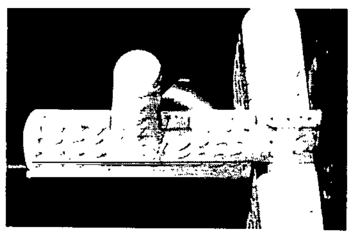

α = 30°


α = 55°


α = 80°

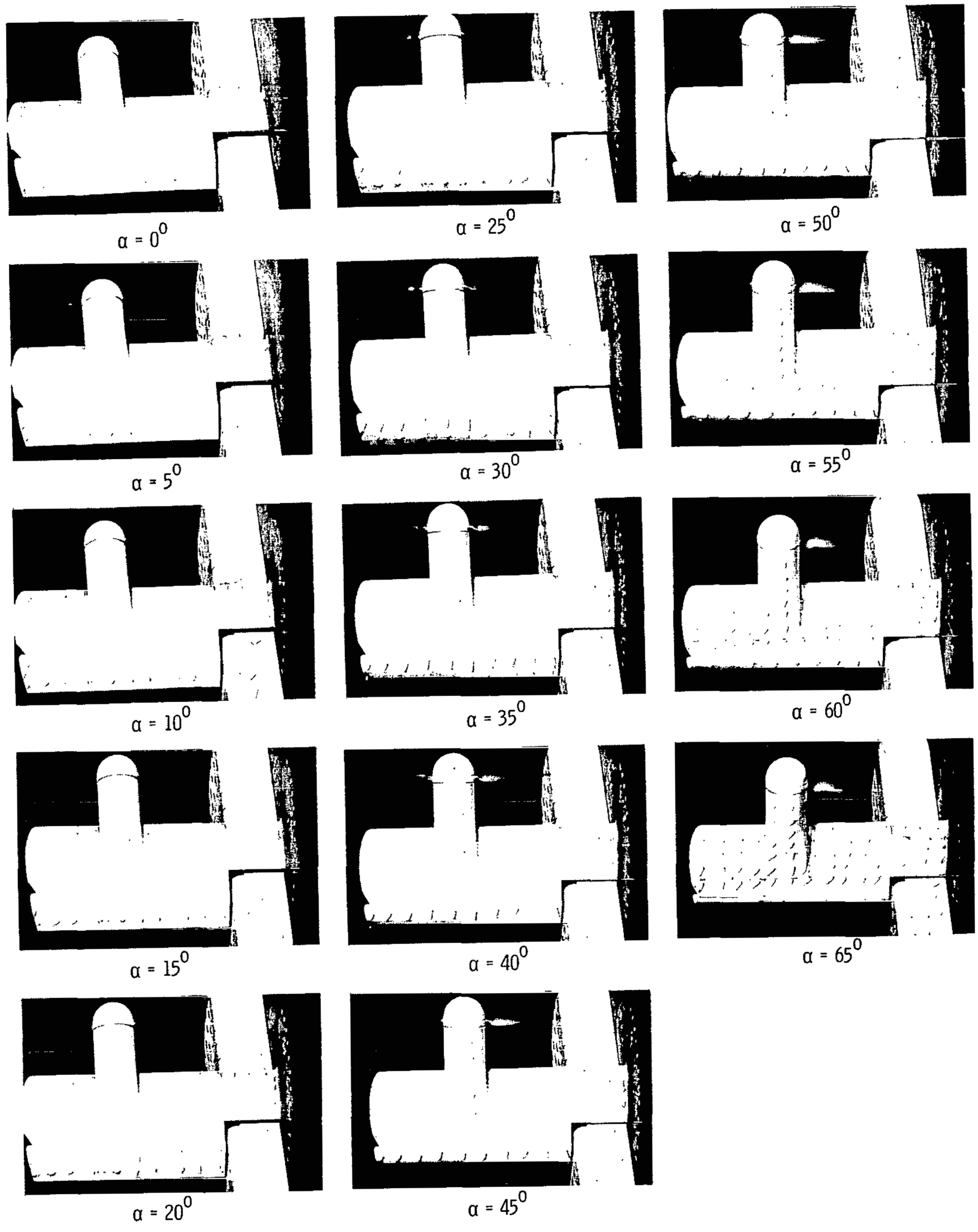

α = 35°


α = 60°


α = 85°

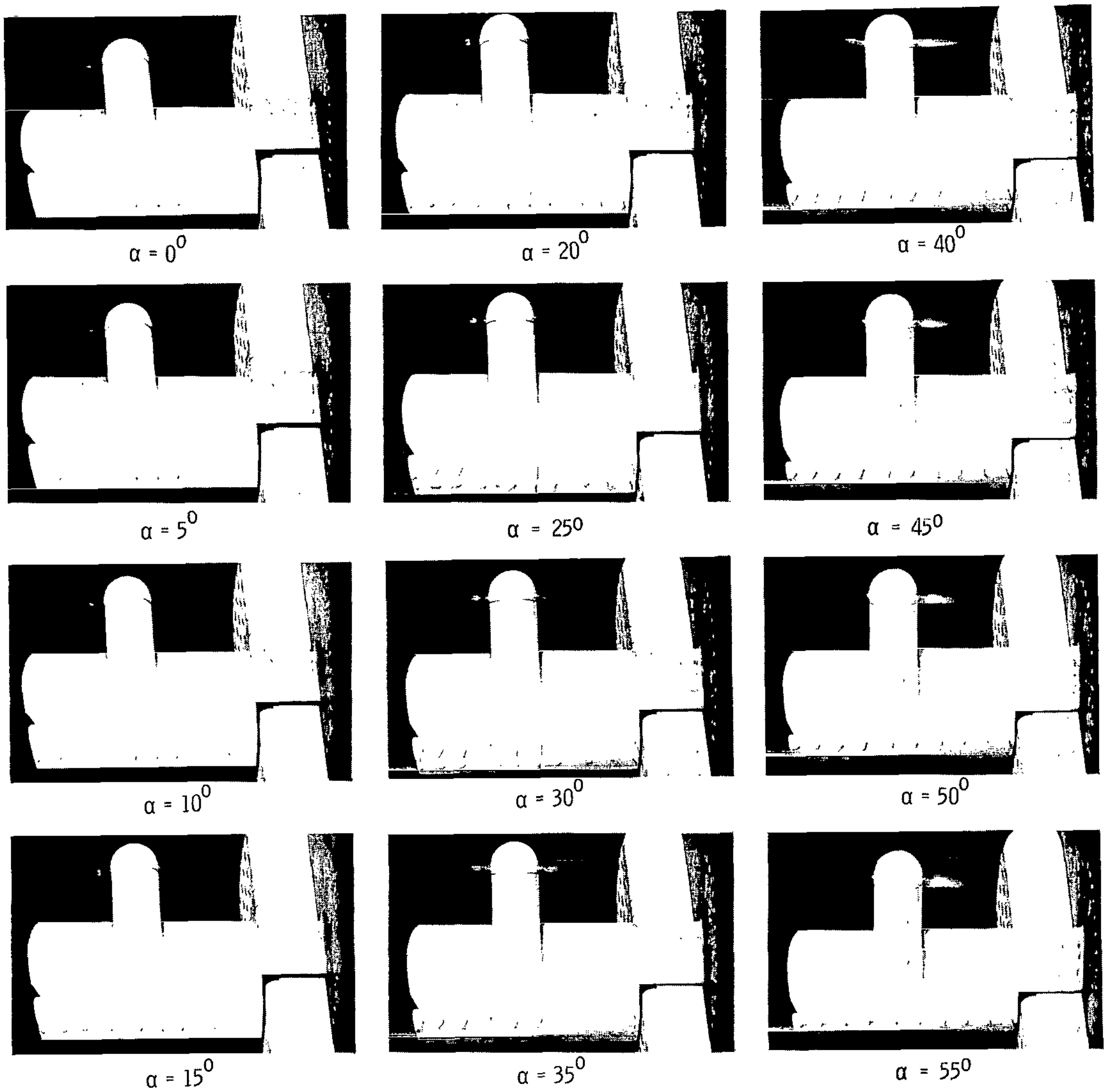
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 6.- Continued.



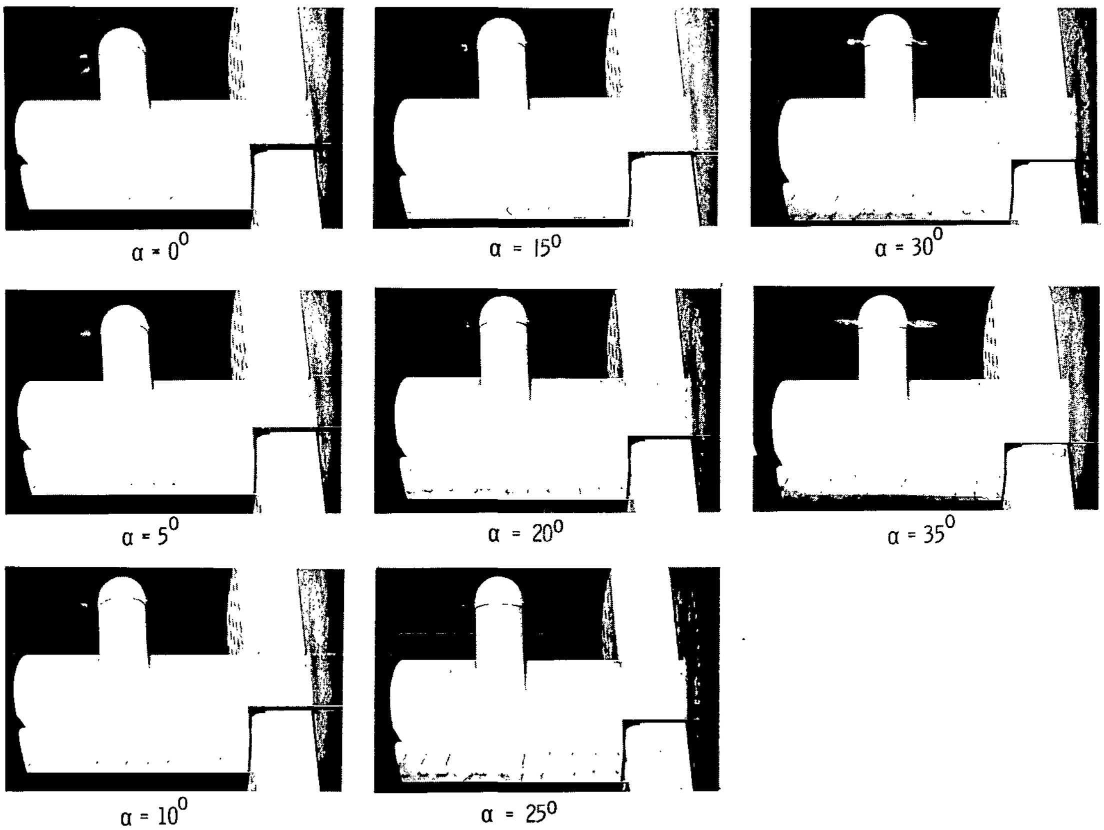
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 6.- Continued.



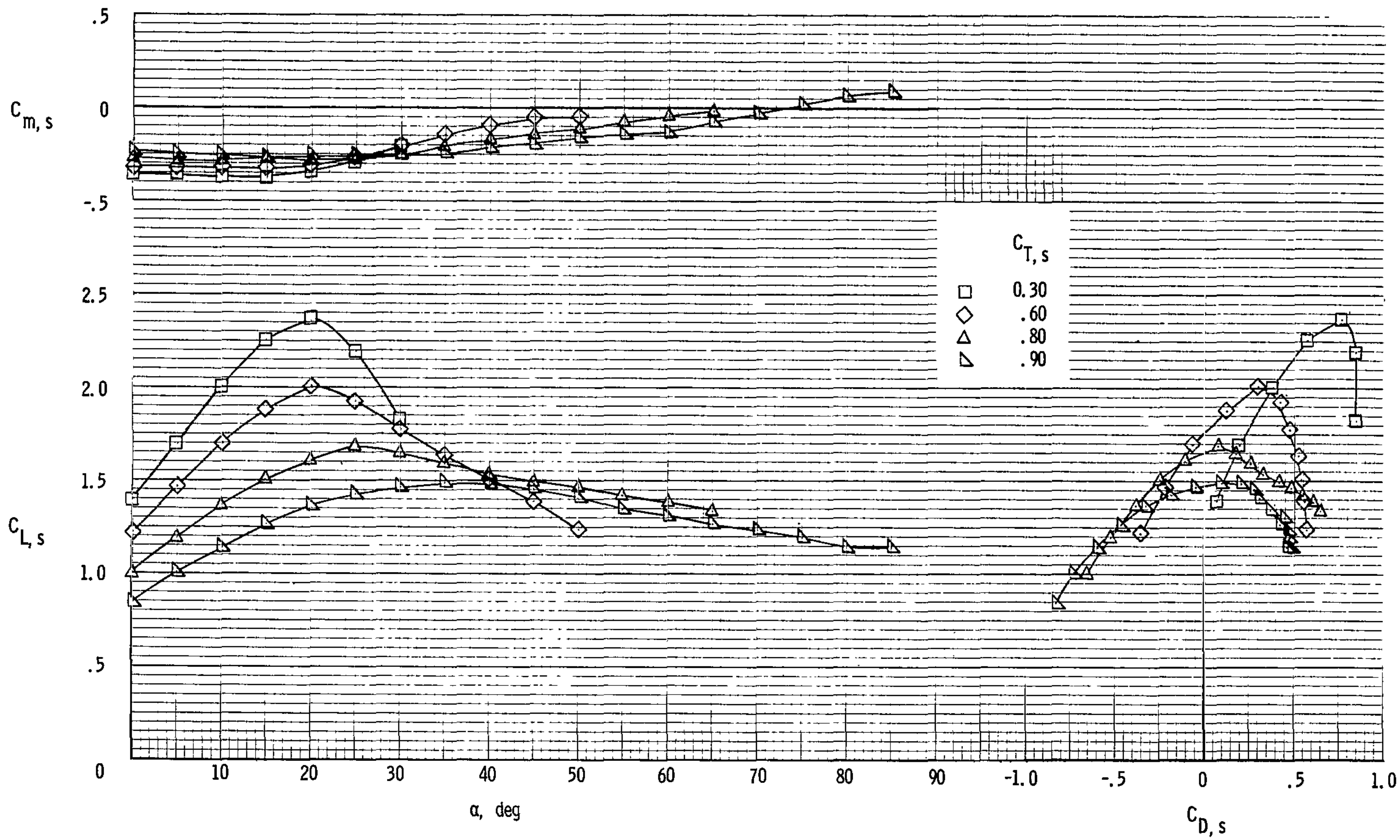
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 6.- Continued.



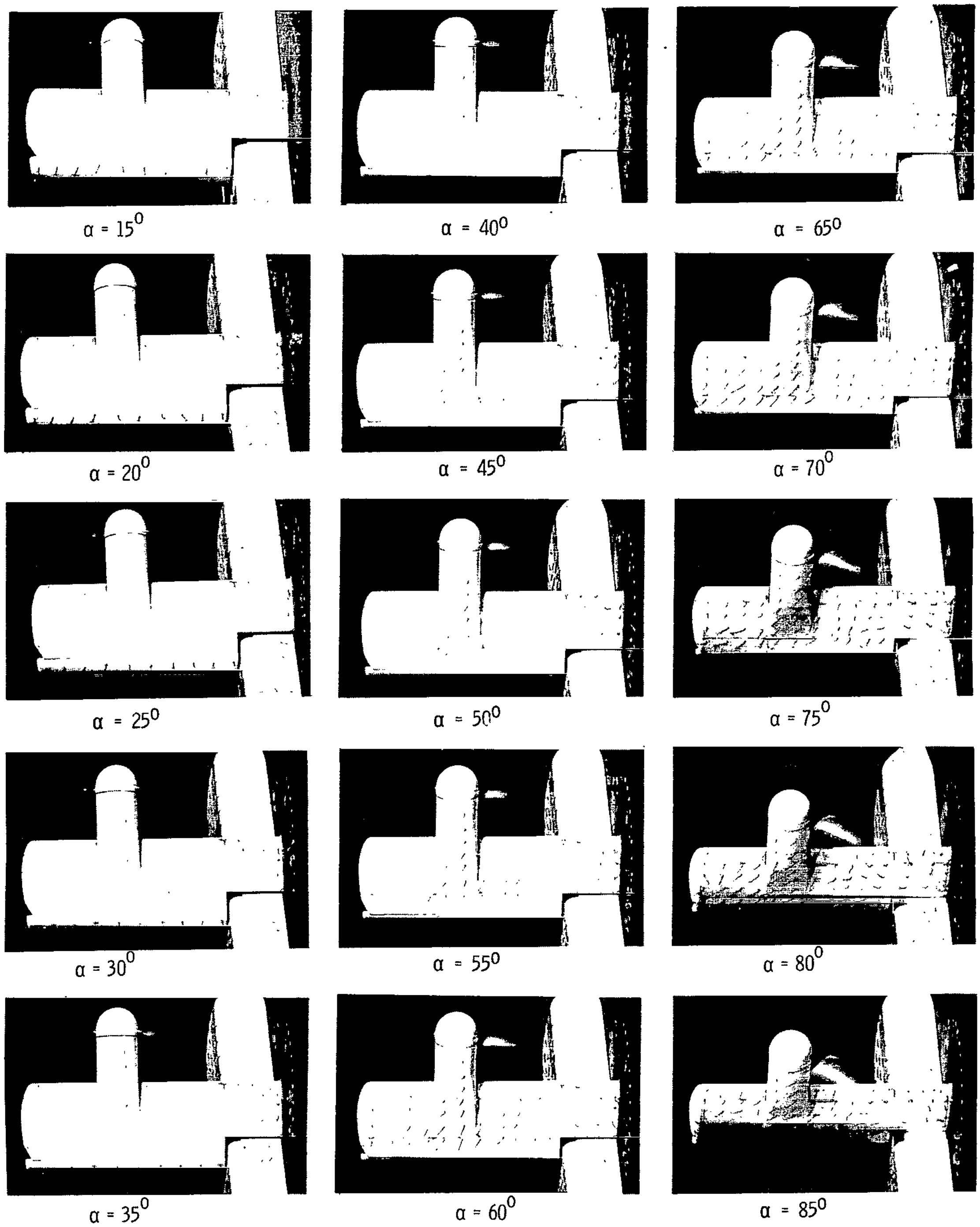
(e) Flow characteristics; $C_{T,s}$ = 0.30.

Figure 6.- Concluded.



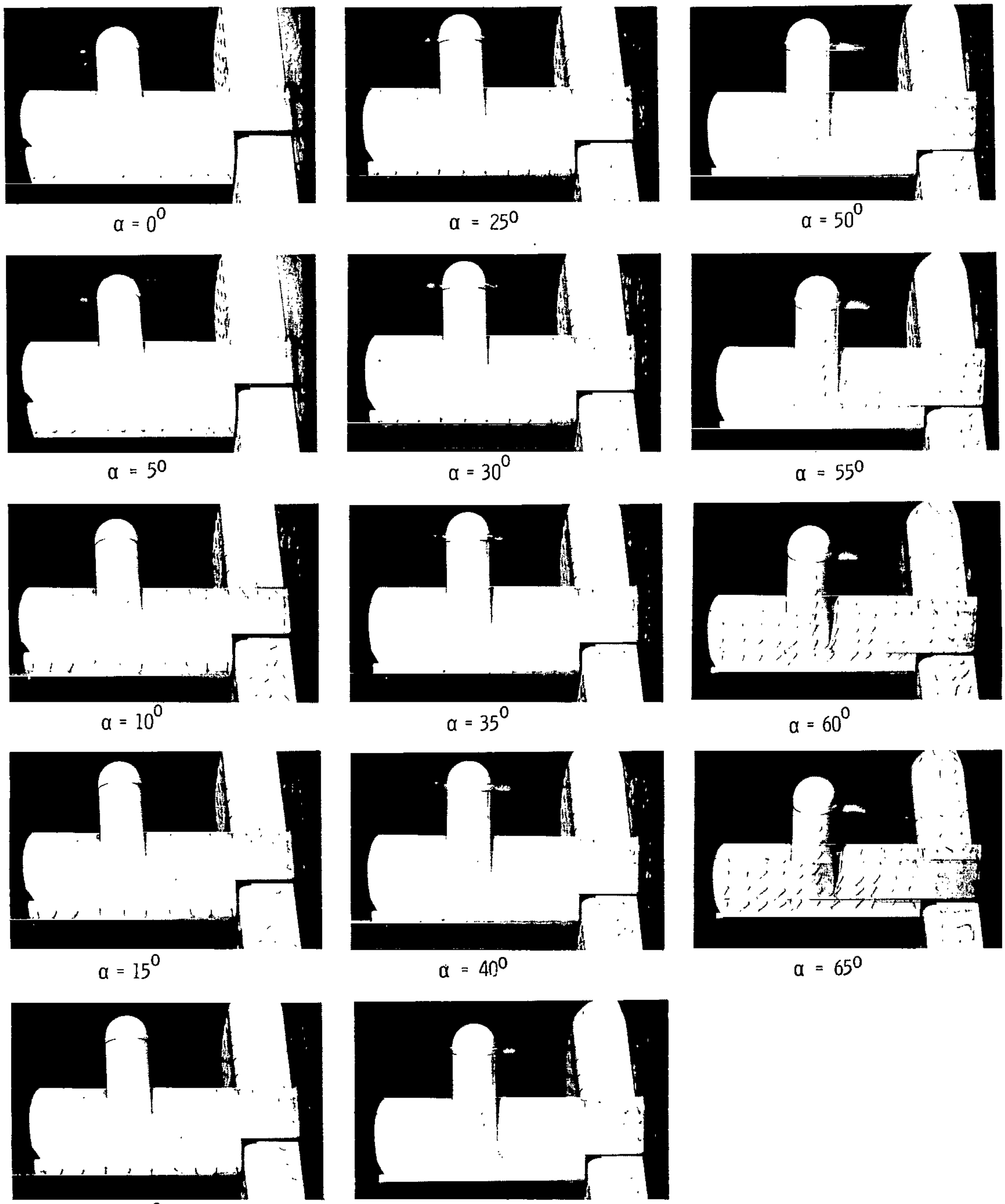
(a) Aerodynamic characteristics.

Figure 7.- Aerodynamic and flow characteristics of the wing with propeller rotation up at the tip. Basic leading edge; $\delta_f = 60^0$.



(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 7.- Continued.



$\alpha = 0^0$ $\alpha = 25^0$ $\alpha = 50^0$

$\alpha = 5^0$ $\alpha = 30^0$ $\alpha = 55^0$

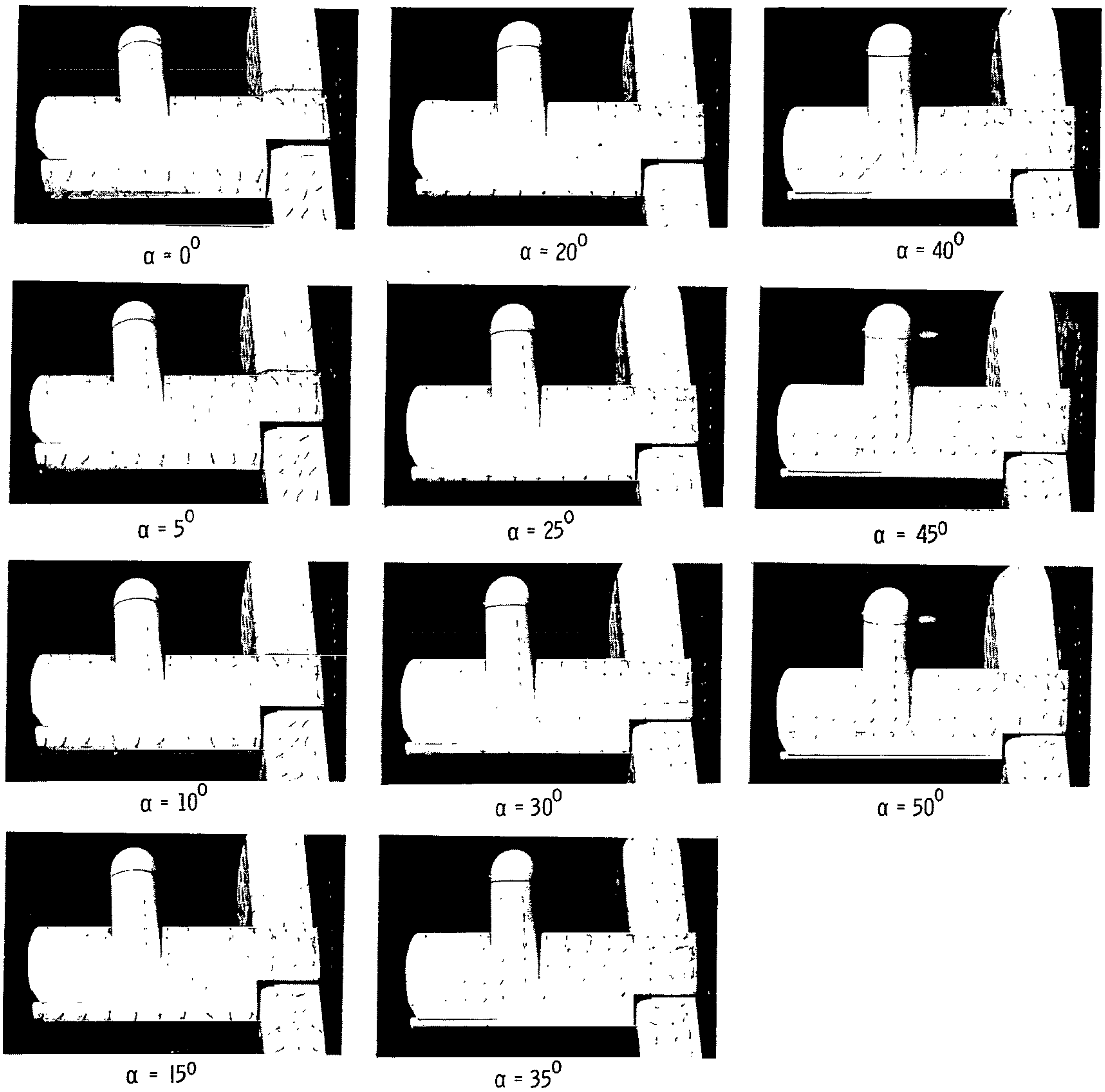
$\alpha = 10^0$ $\alpha = 35^0$ $\alpha = 60^0$

$\alpha = 15^0$ $\alpha = 40^0$ $\alpha = 65^0$

$\alpha = 20^0$ $\alpha = 45^0$

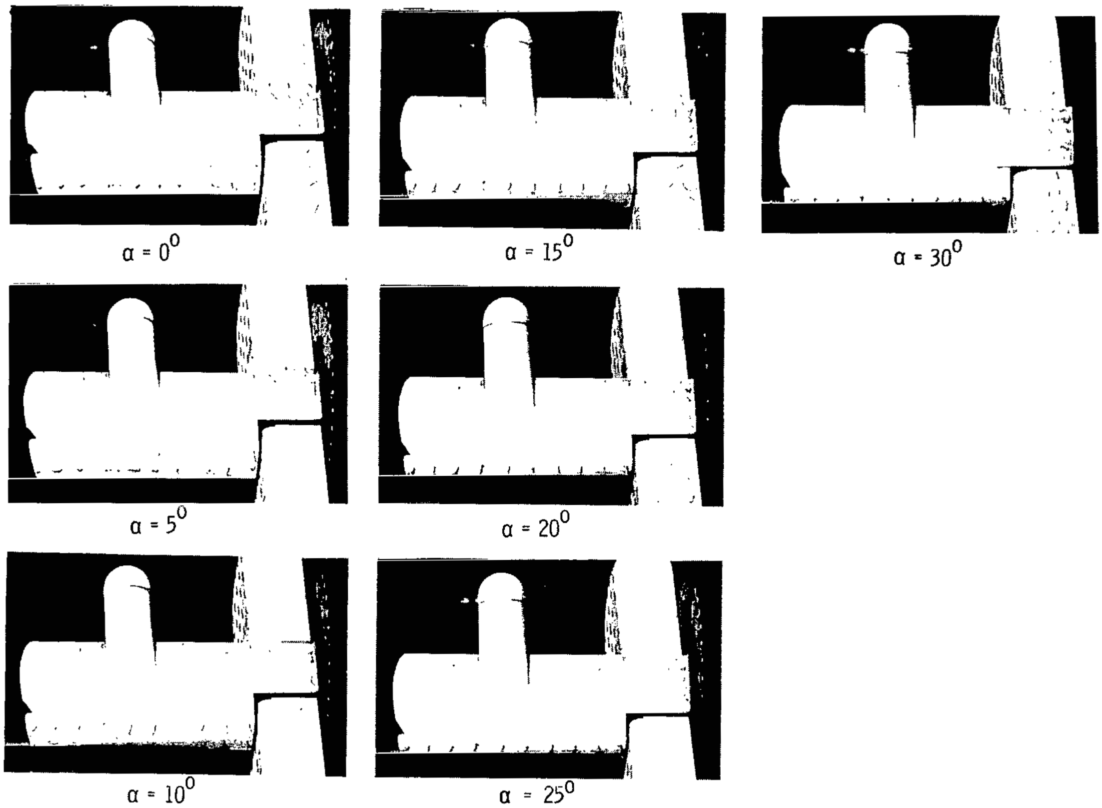
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 7.- Continued.



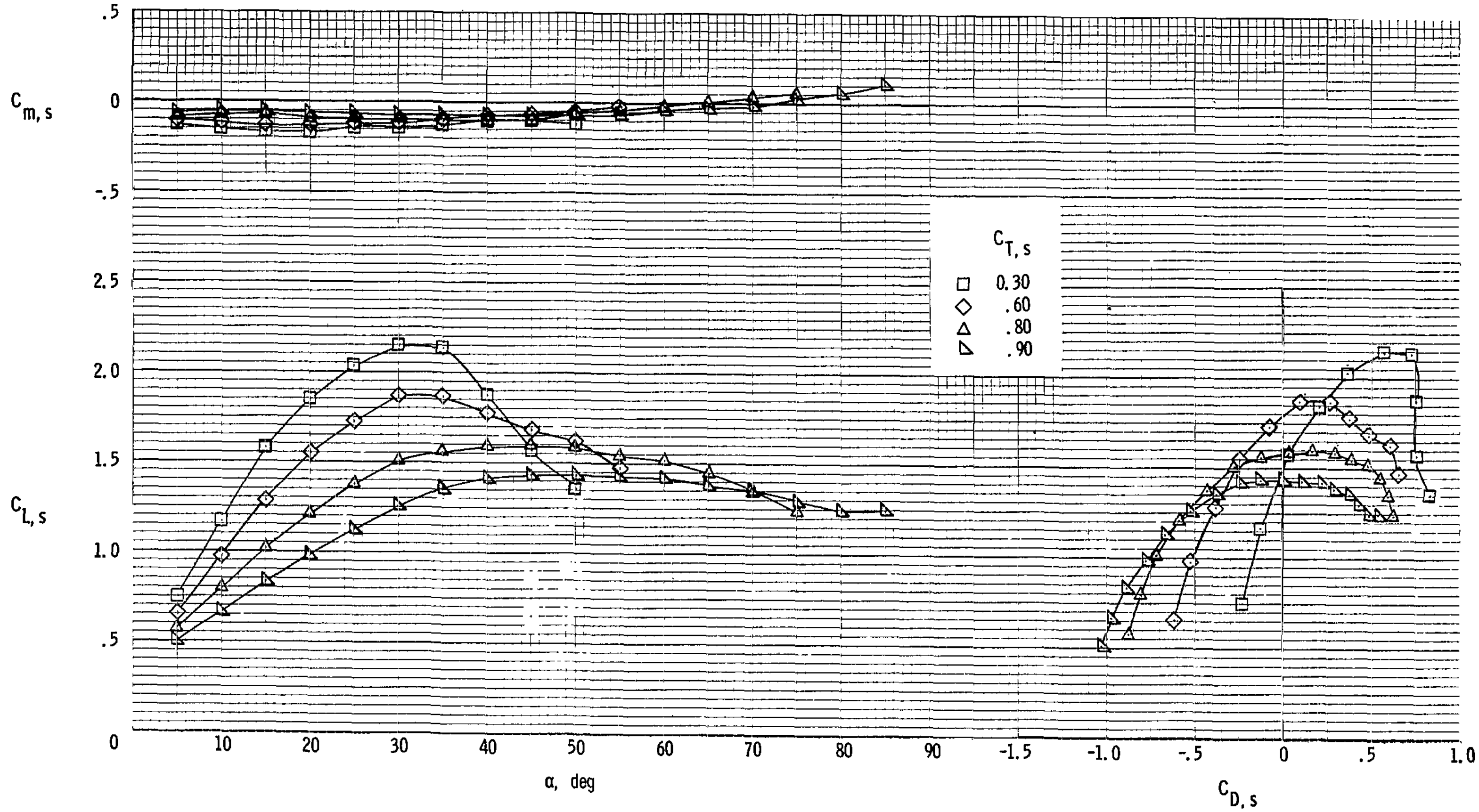
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 7.- Continued.



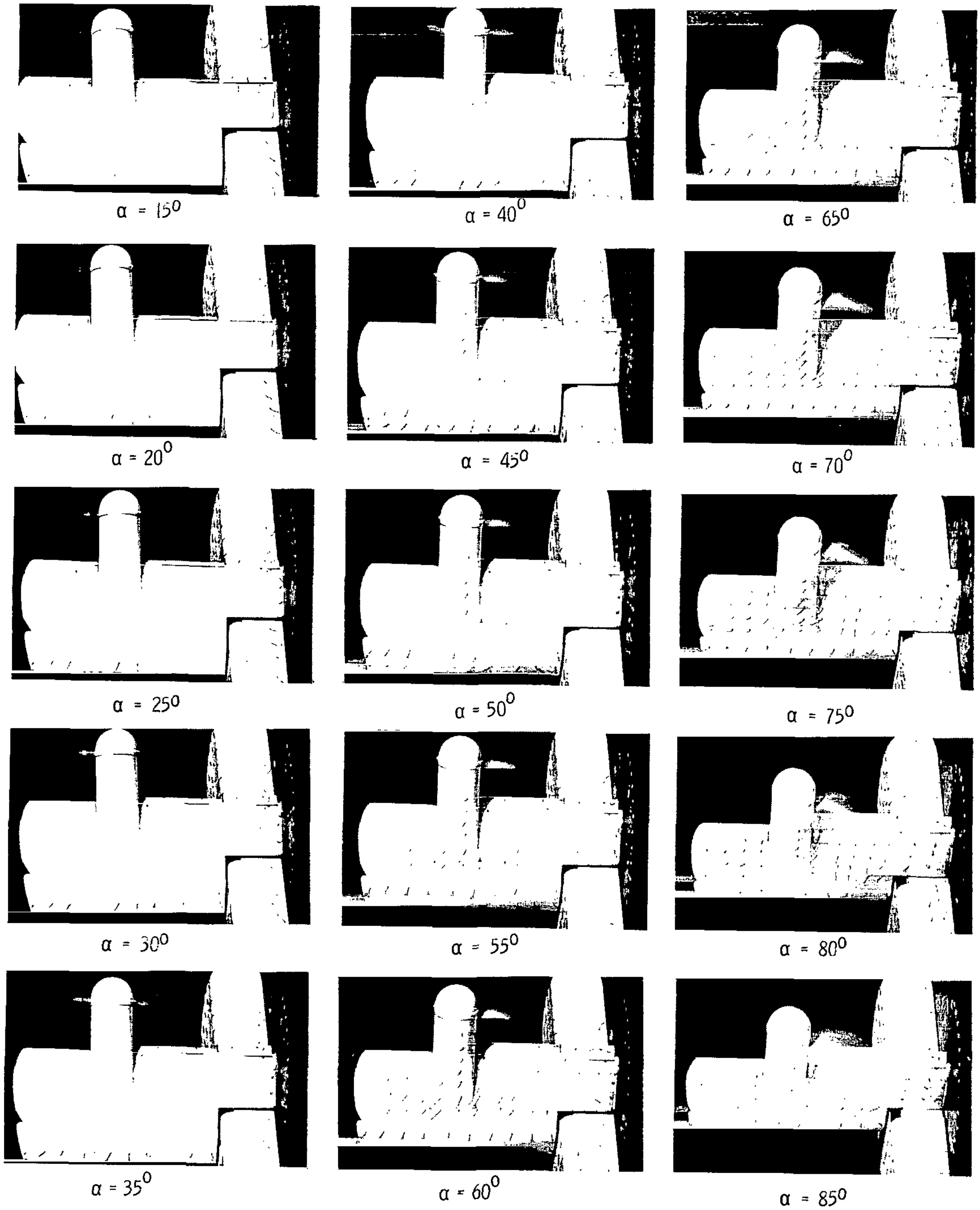
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 7.- Concluded.



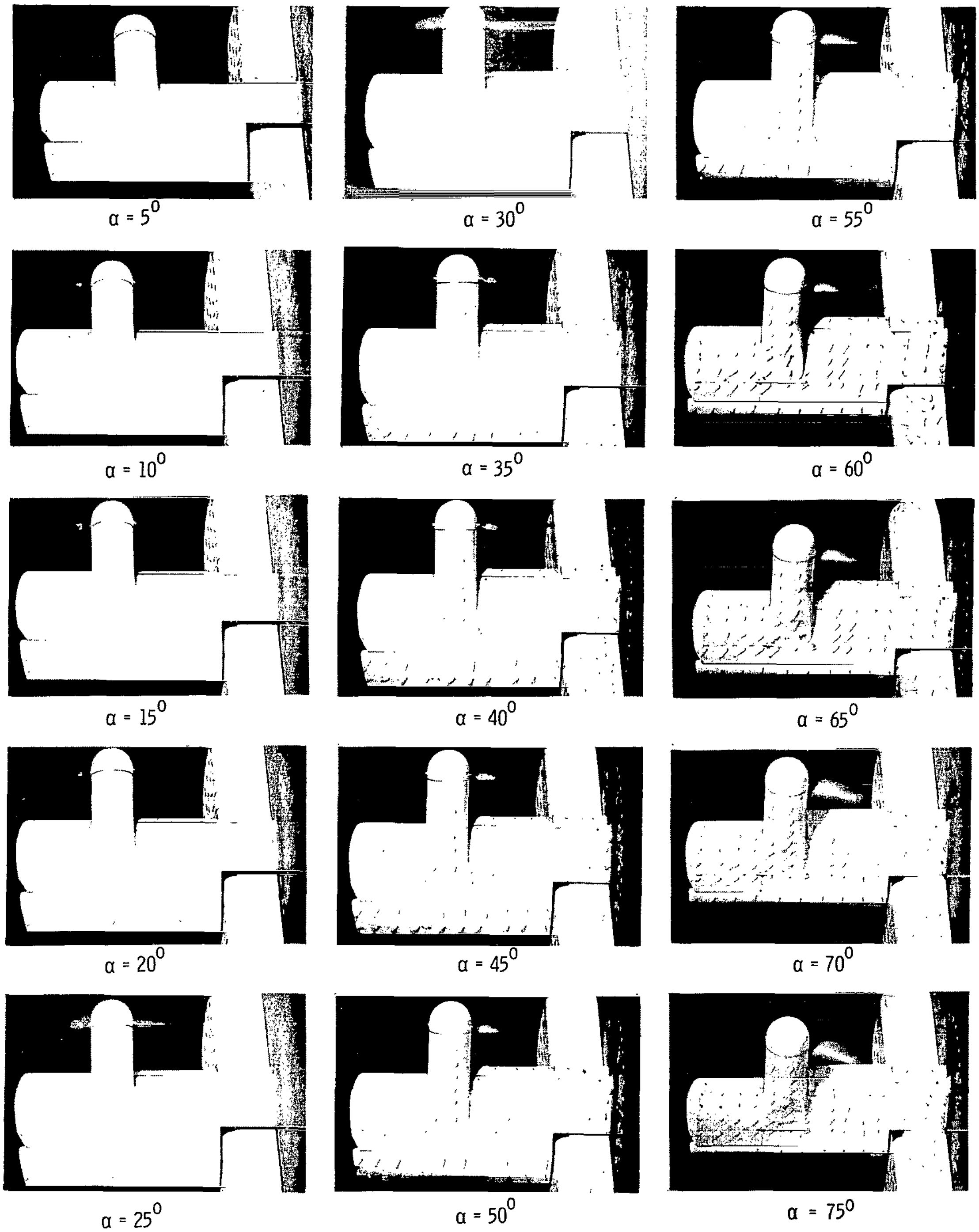
(a) Aerodynamic characteristics.

Figure 8.- Aerodynamic and flow characteristics of the wing with propeller rotation up at the tip. Inboard slat on; $\delta_f = 20^o$.



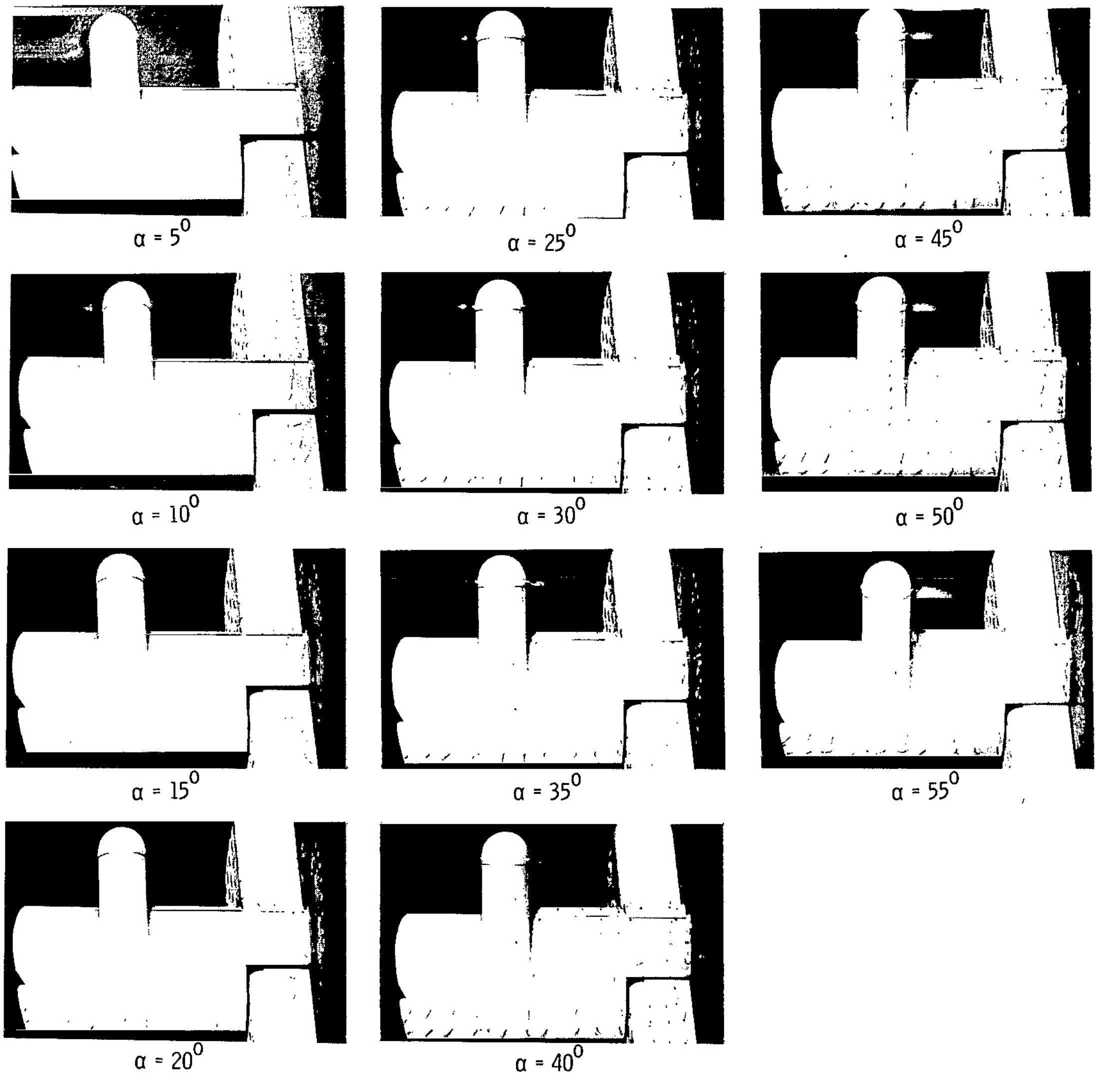
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 8.- Continued.



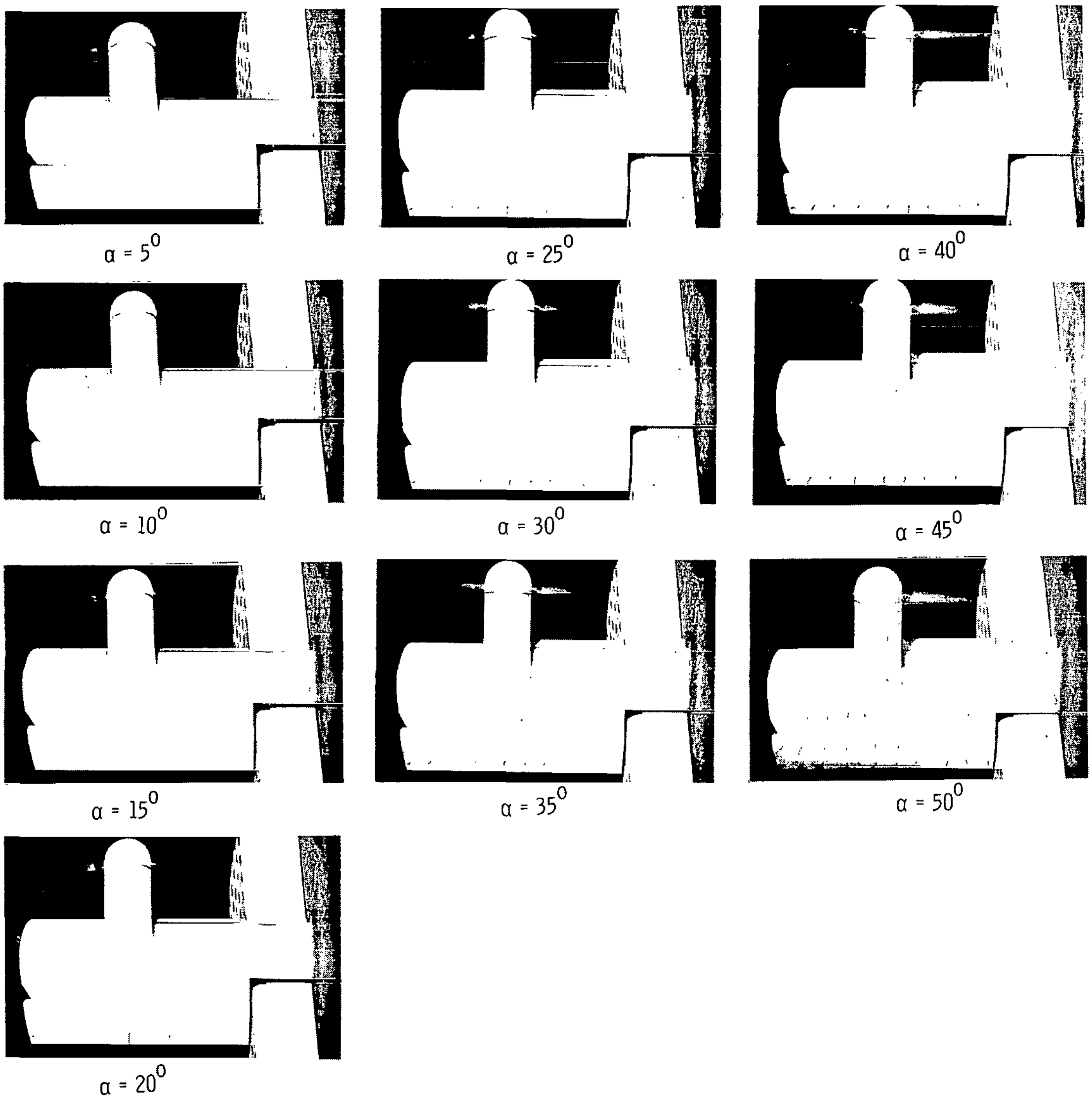
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 8.- Continued.



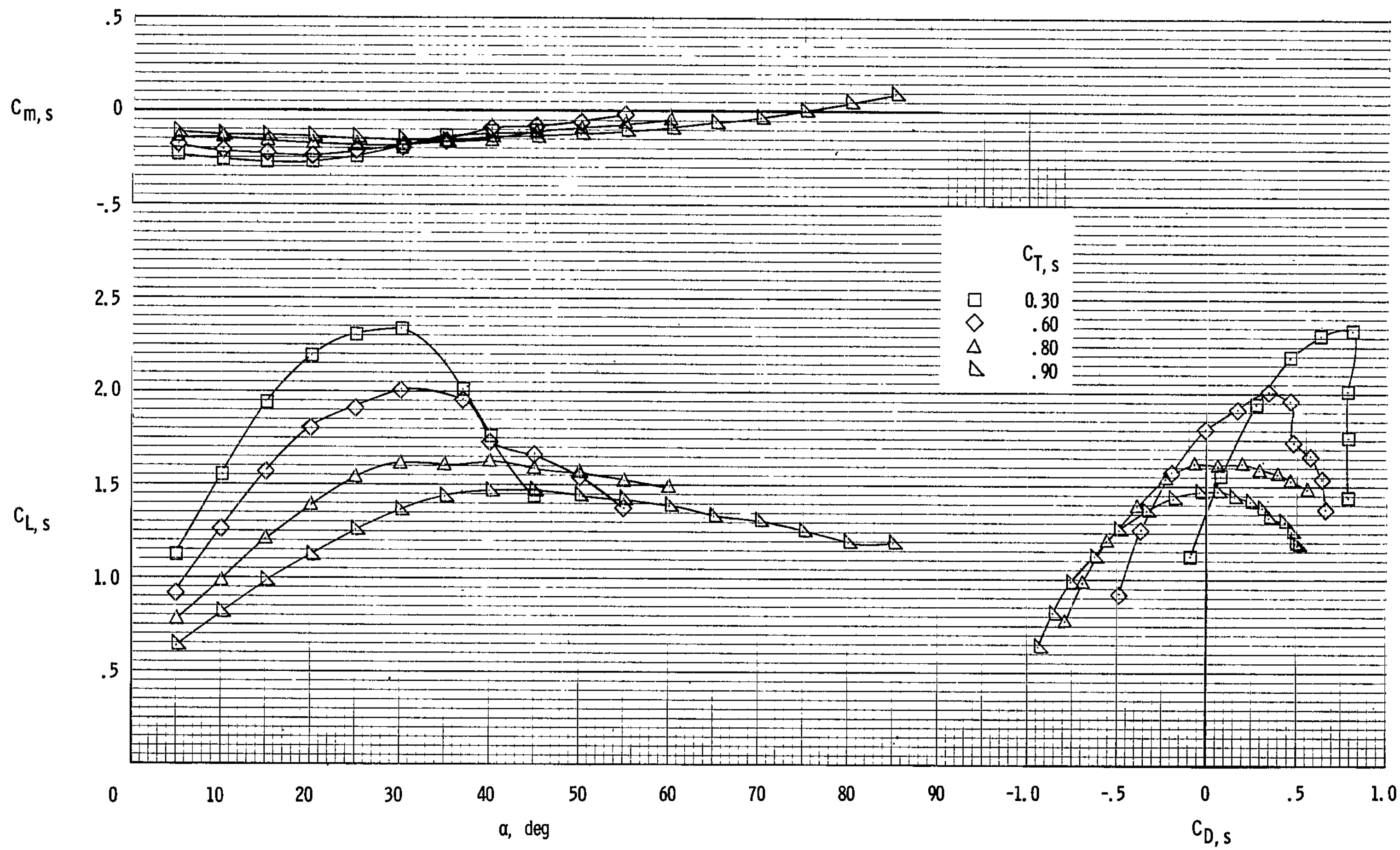
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 8.- Continued.



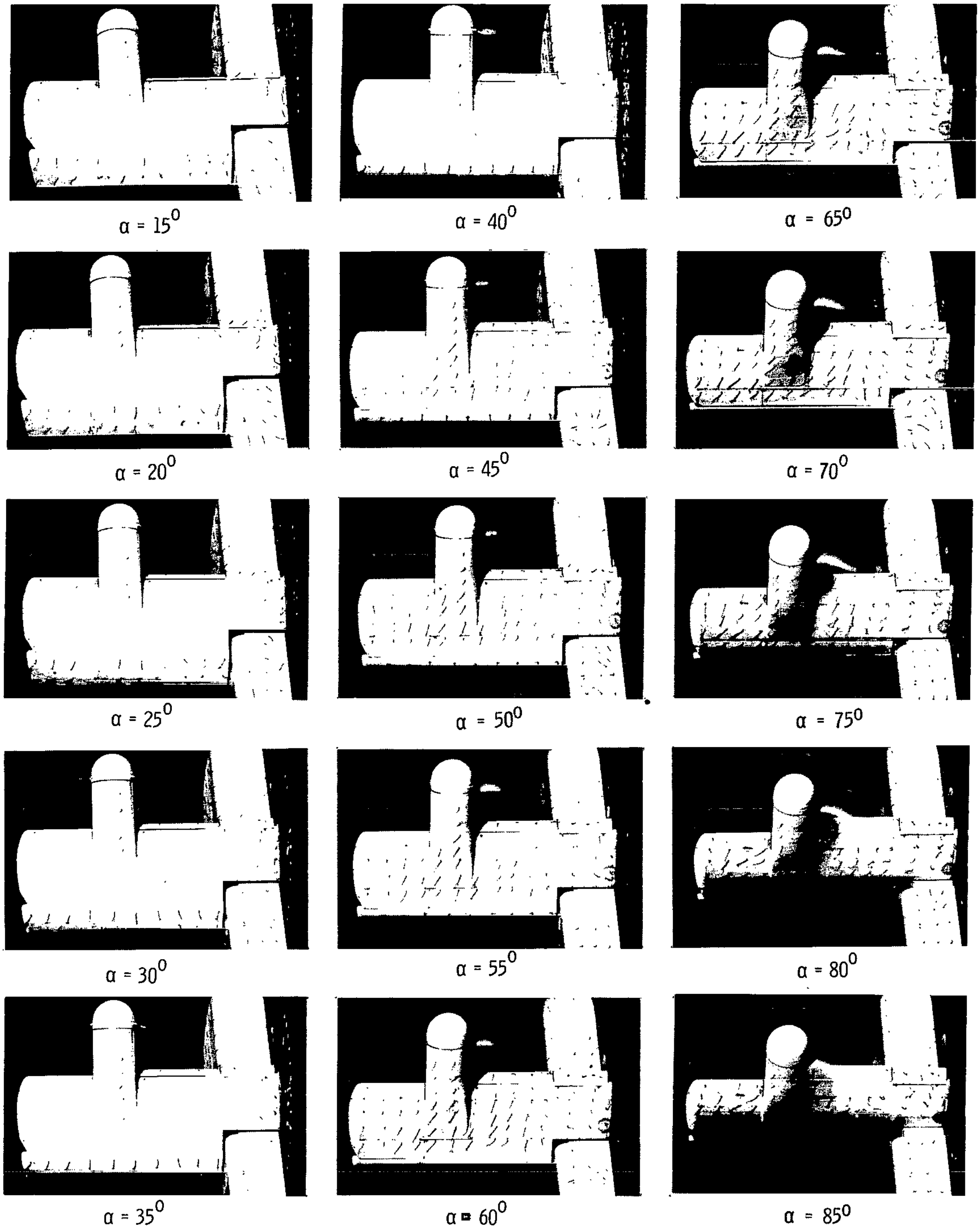
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 8.- Concluded.



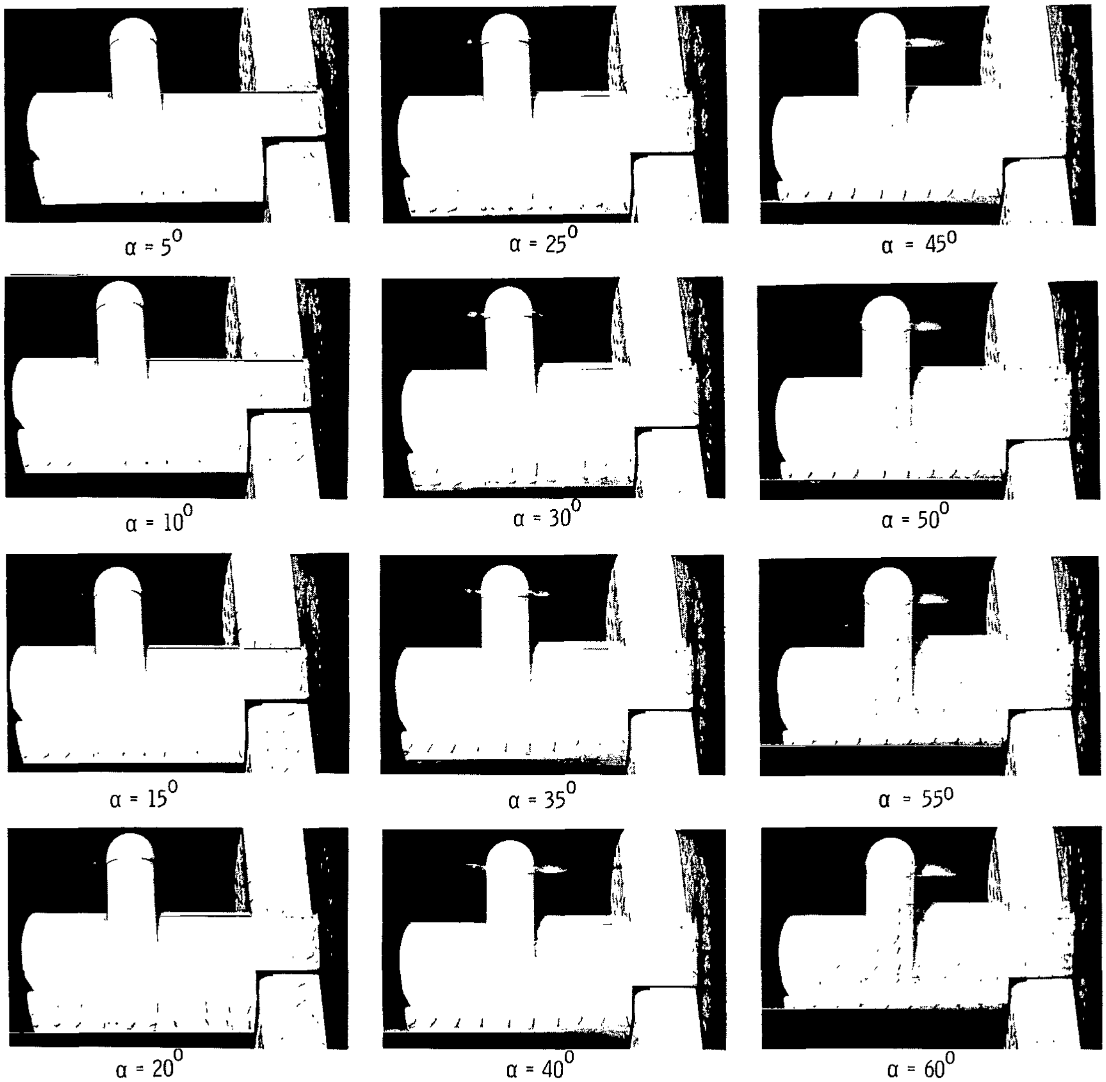
(a) Aerodynamic characteristics.

Figure 9.- Aerodynamic and flow characteristics of the wing with propeller rotation up at the tip. Inboard slat on; $\delta_f = 40^o$.



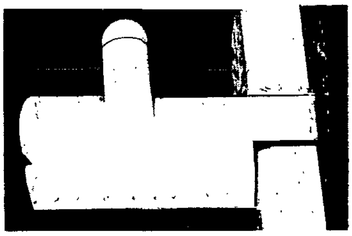
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 9.- Continued.

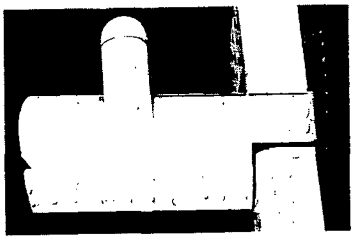


(c) Flow characteristics; $C_{T,s}$ = 0.80.

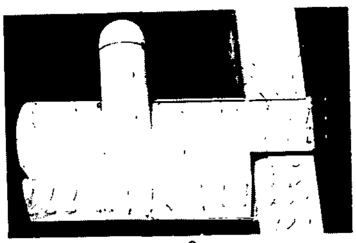
Figure 9.- Continued.



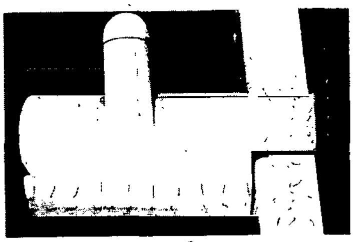
$\alpha = 5^0$



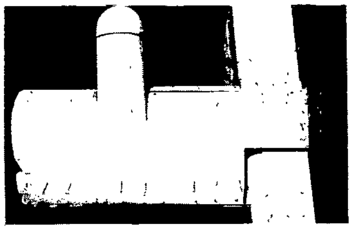
$\alpha = 10^0$



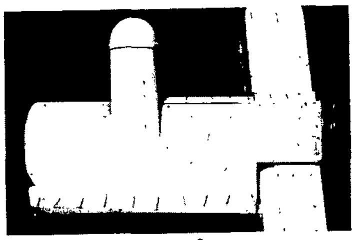
$\alpha = 15^0$



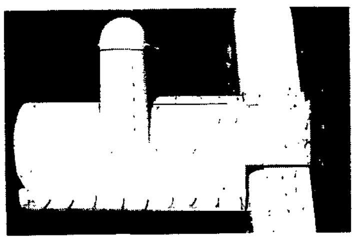
$\alpha = 20^0$



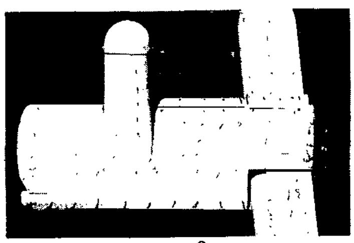
$\alpha = 25^0$



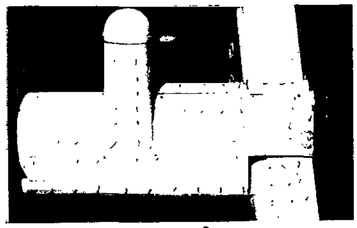
$\alpha = 30^0$



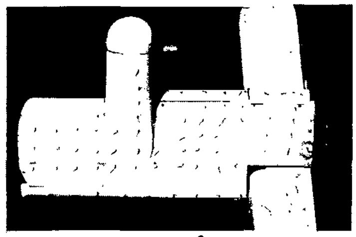
$\alpha = 35^0$



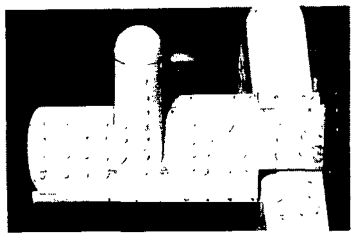
$\alpha = 40^0$



$\alpha = 45^0$



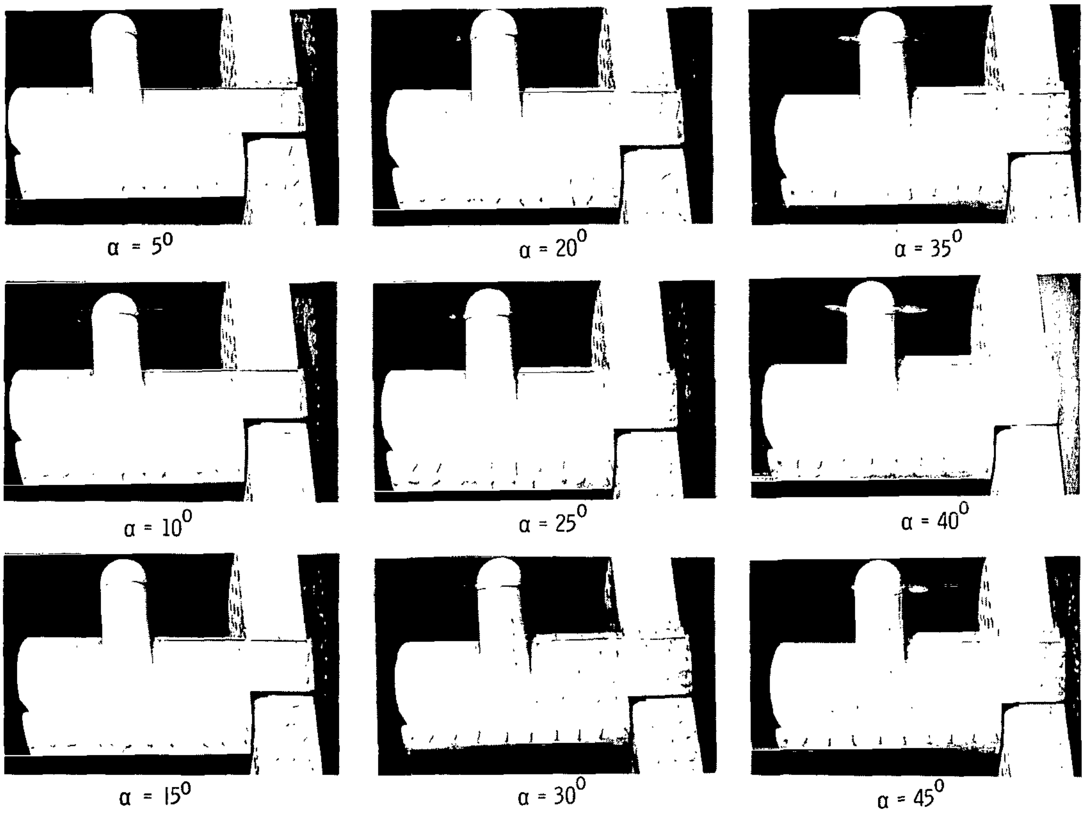
$\alpha = 50^0$



$\alpha = 55^0$

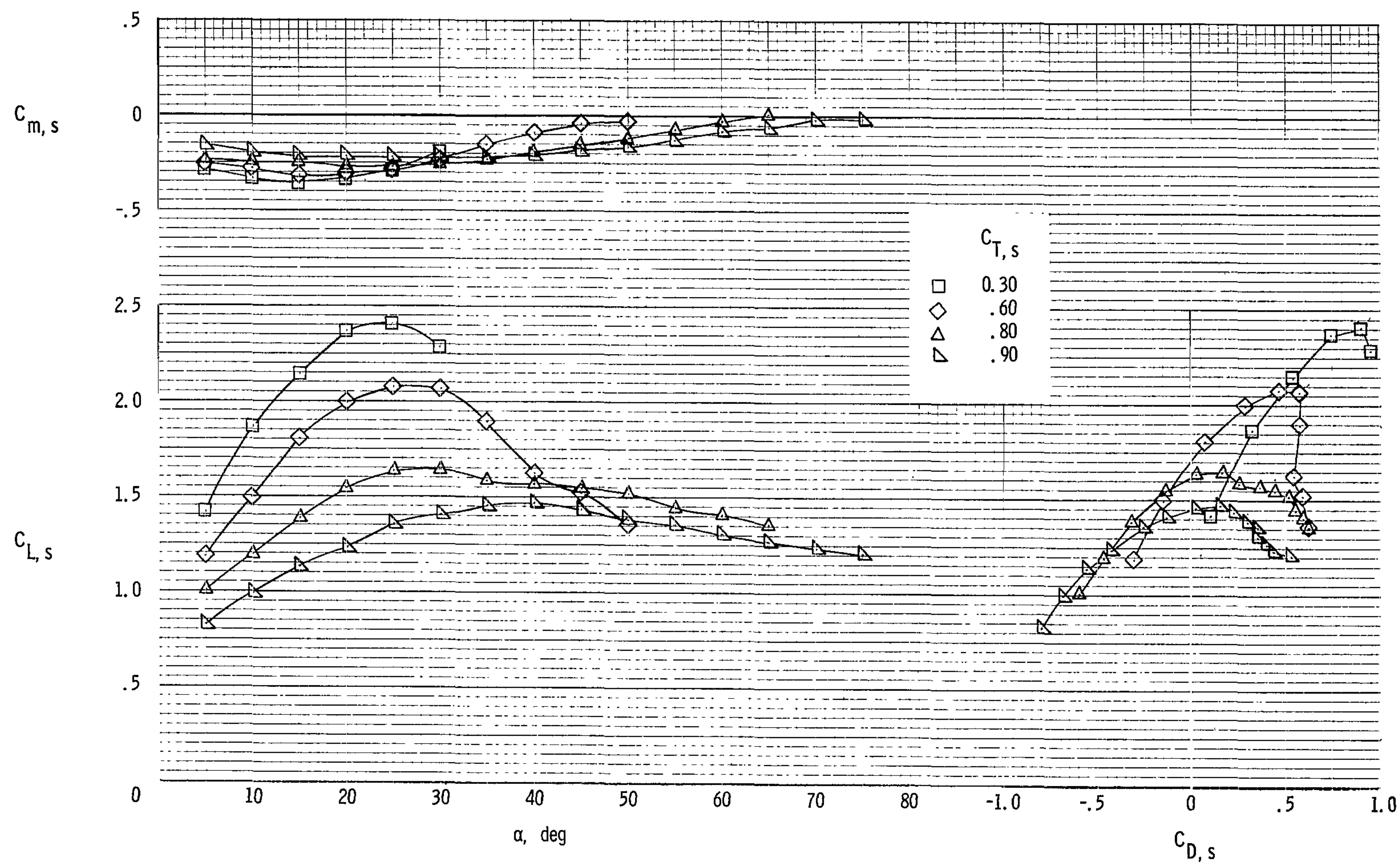
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 9.- Continued.



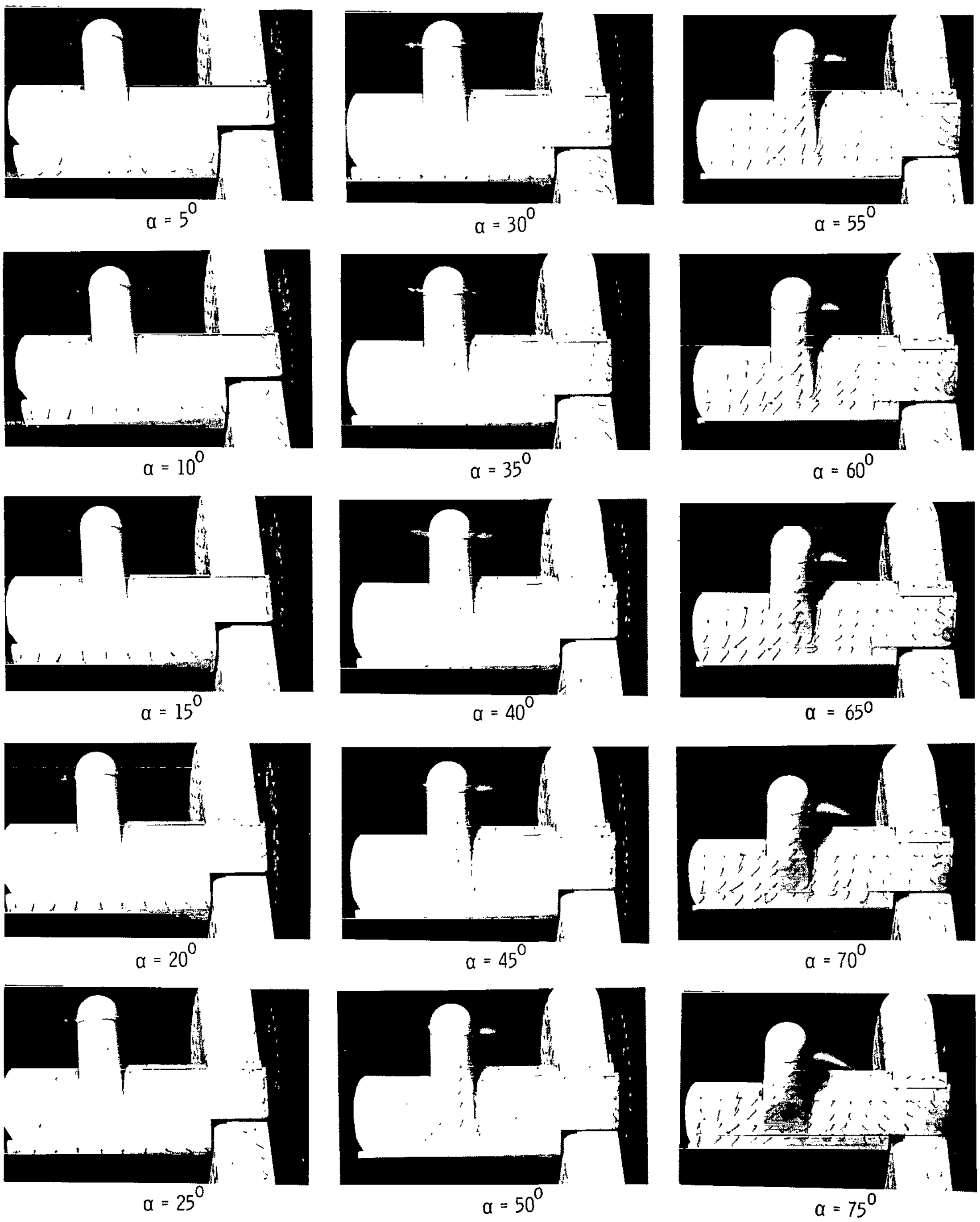
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 9.- Concluded.



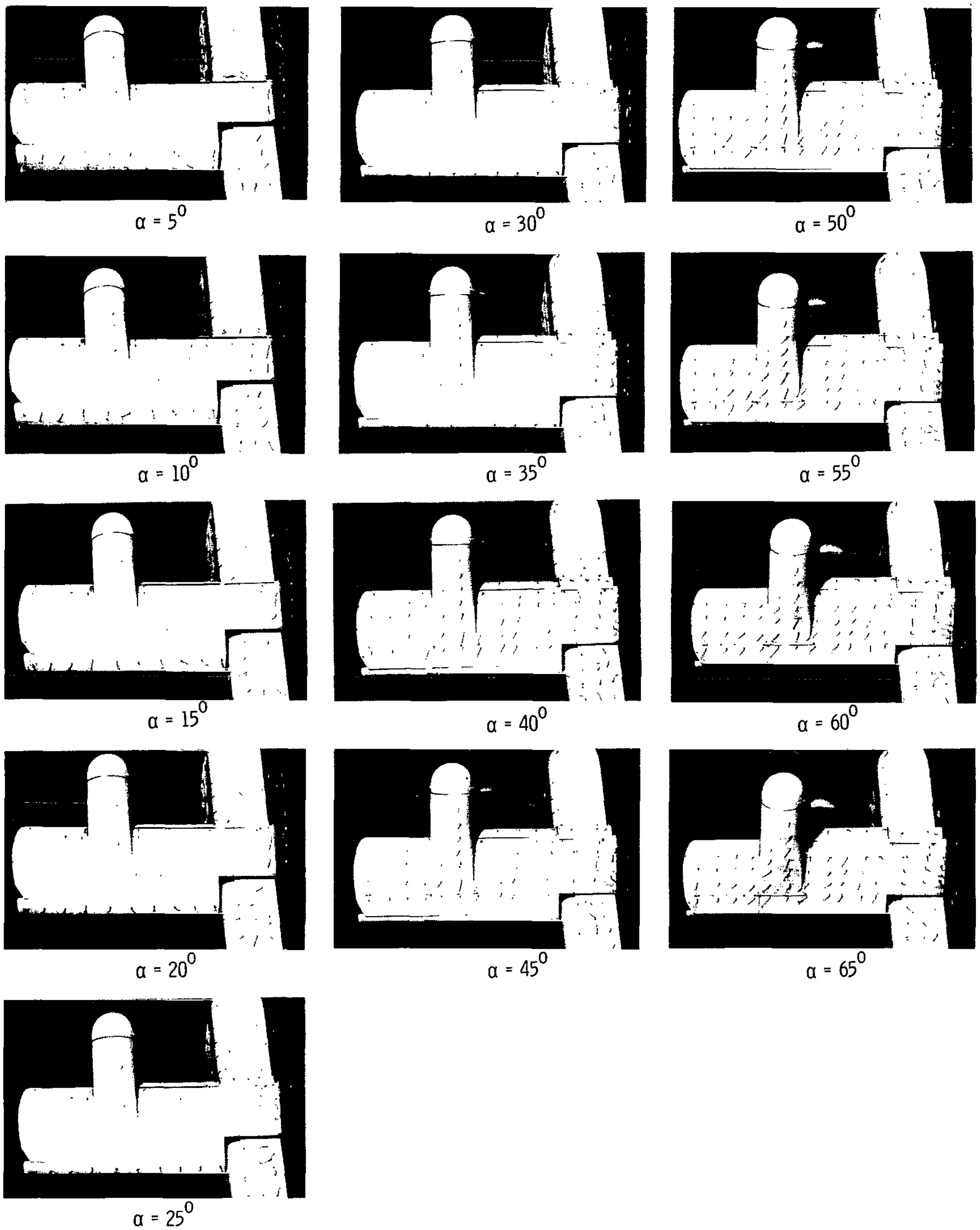
(a) Aerodynamic characteristics.

Figure 10.- Aerodynamic and flow characteristics of the wing with propeller rotation up at the tip. Inboard slat on; $\delta_f = 60^0$.



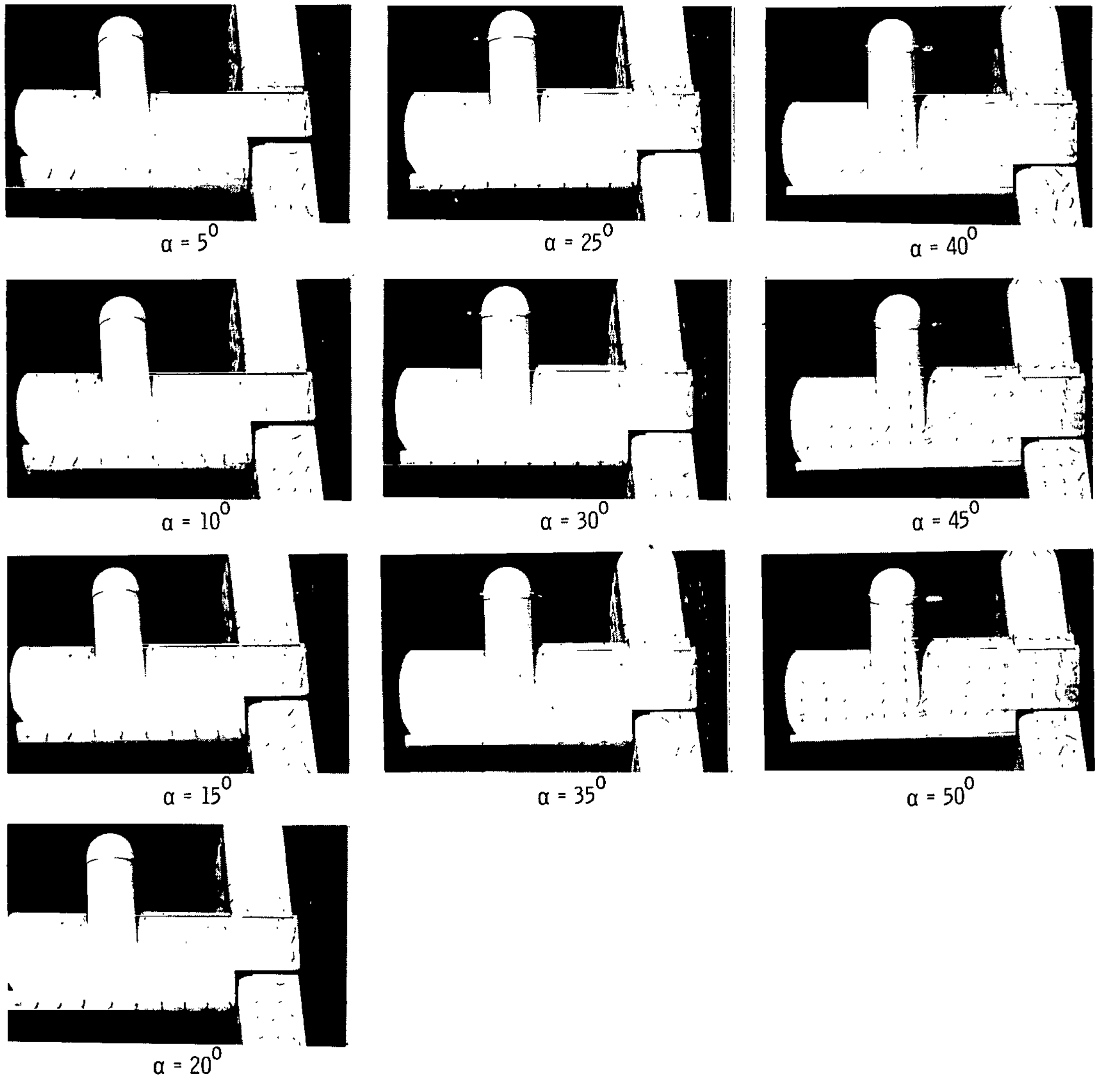
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 10.- Continued.



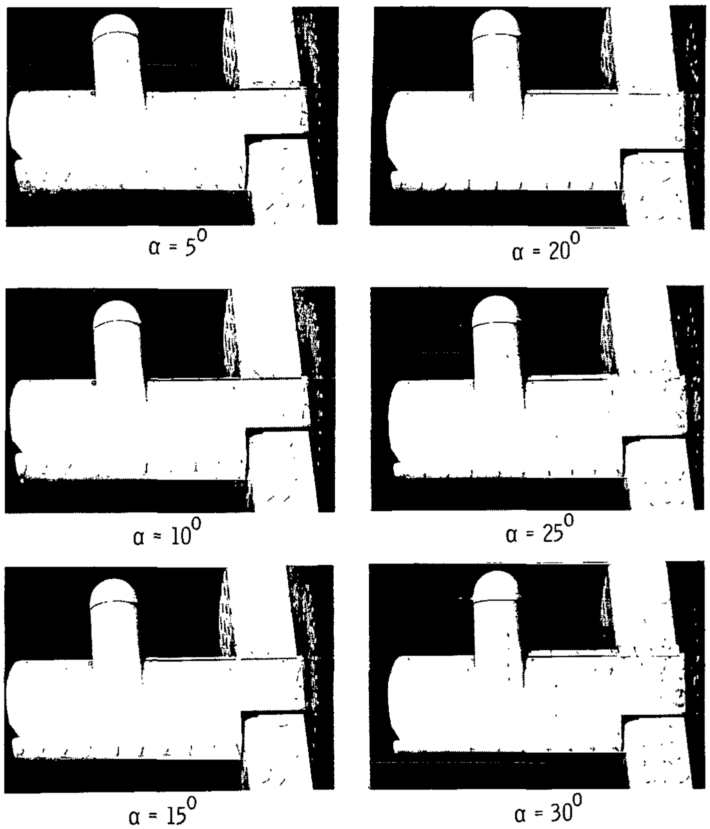
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 10.- Continued.



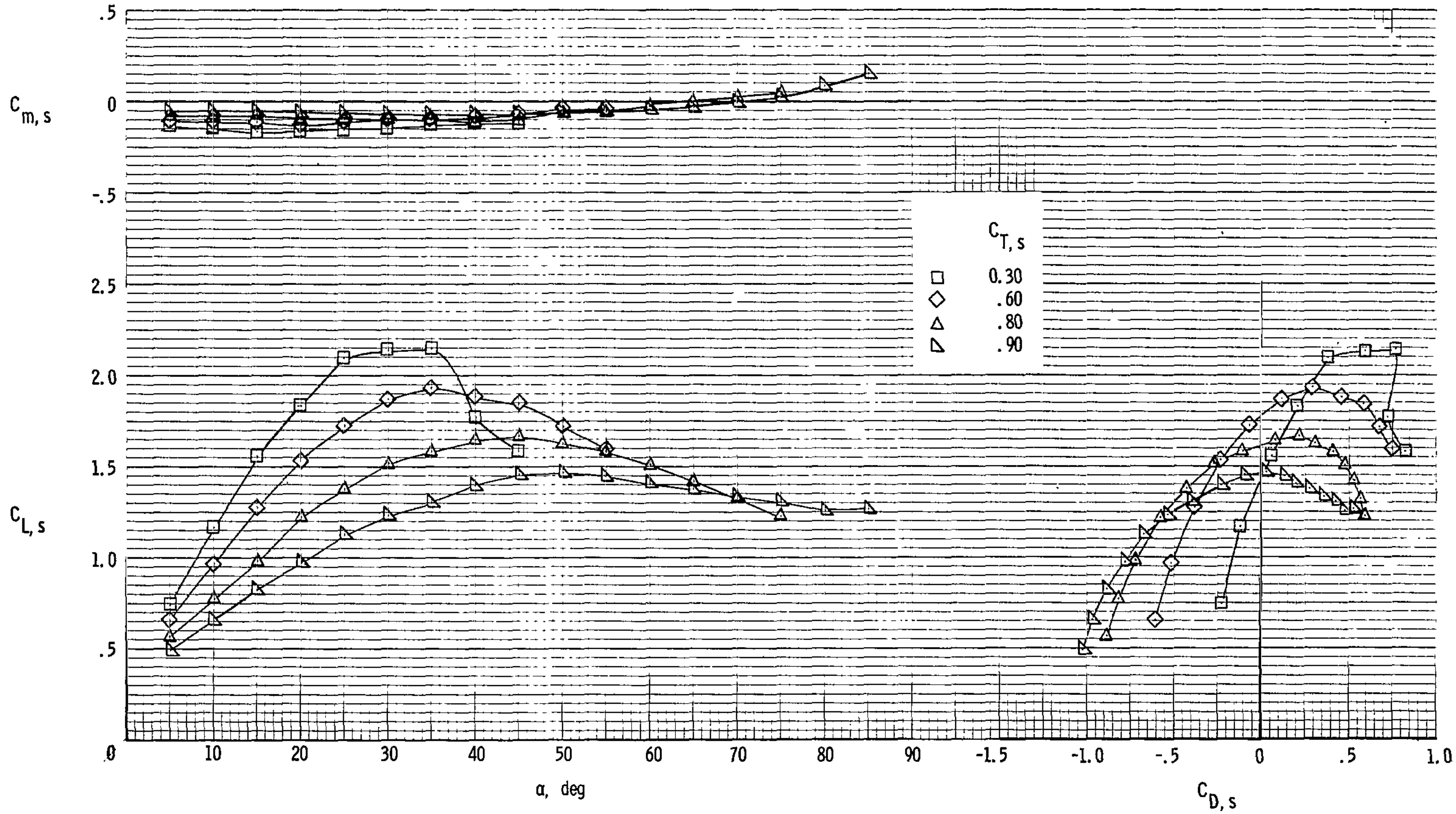
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 10.- Continued.



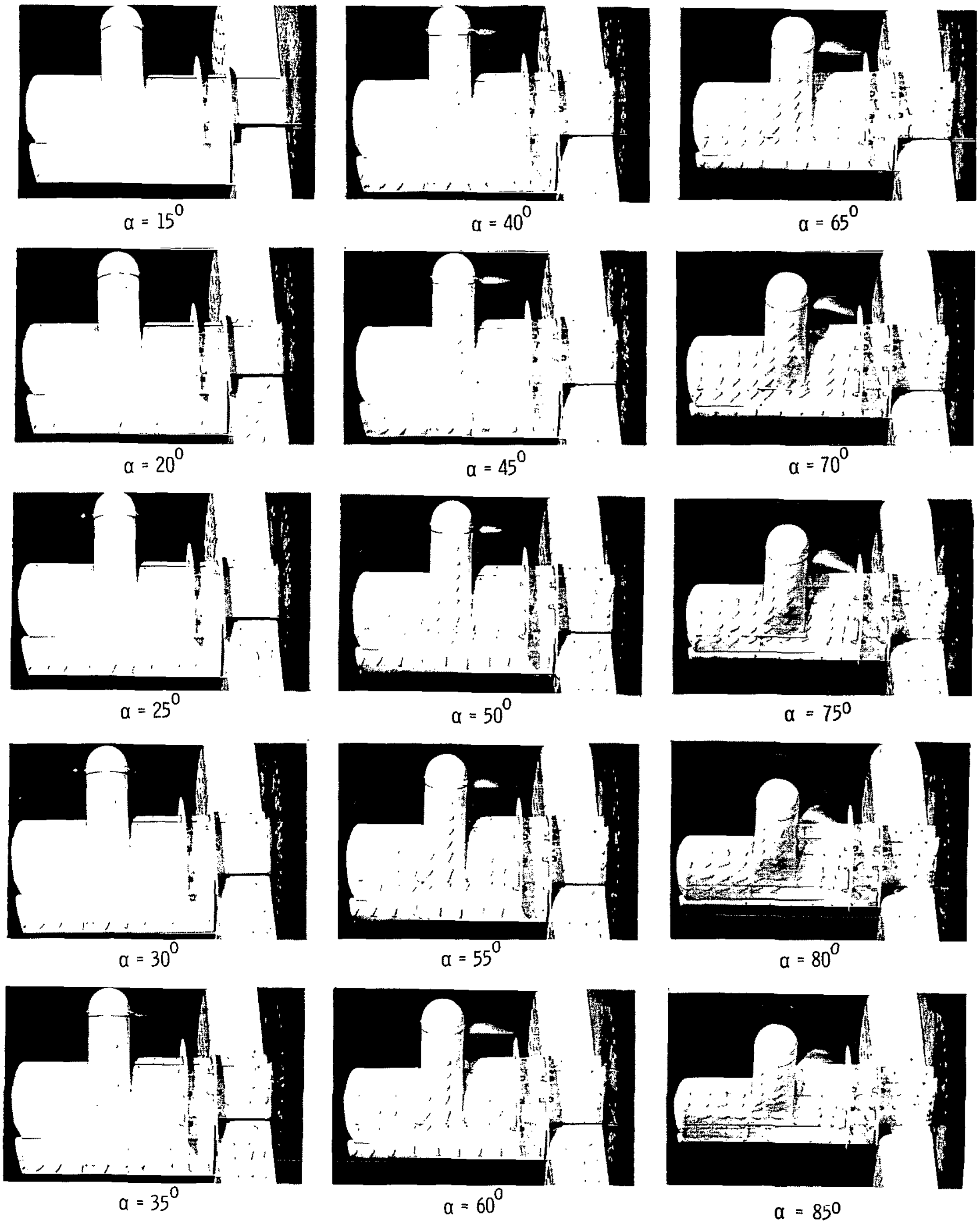
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 10.- Concluded.



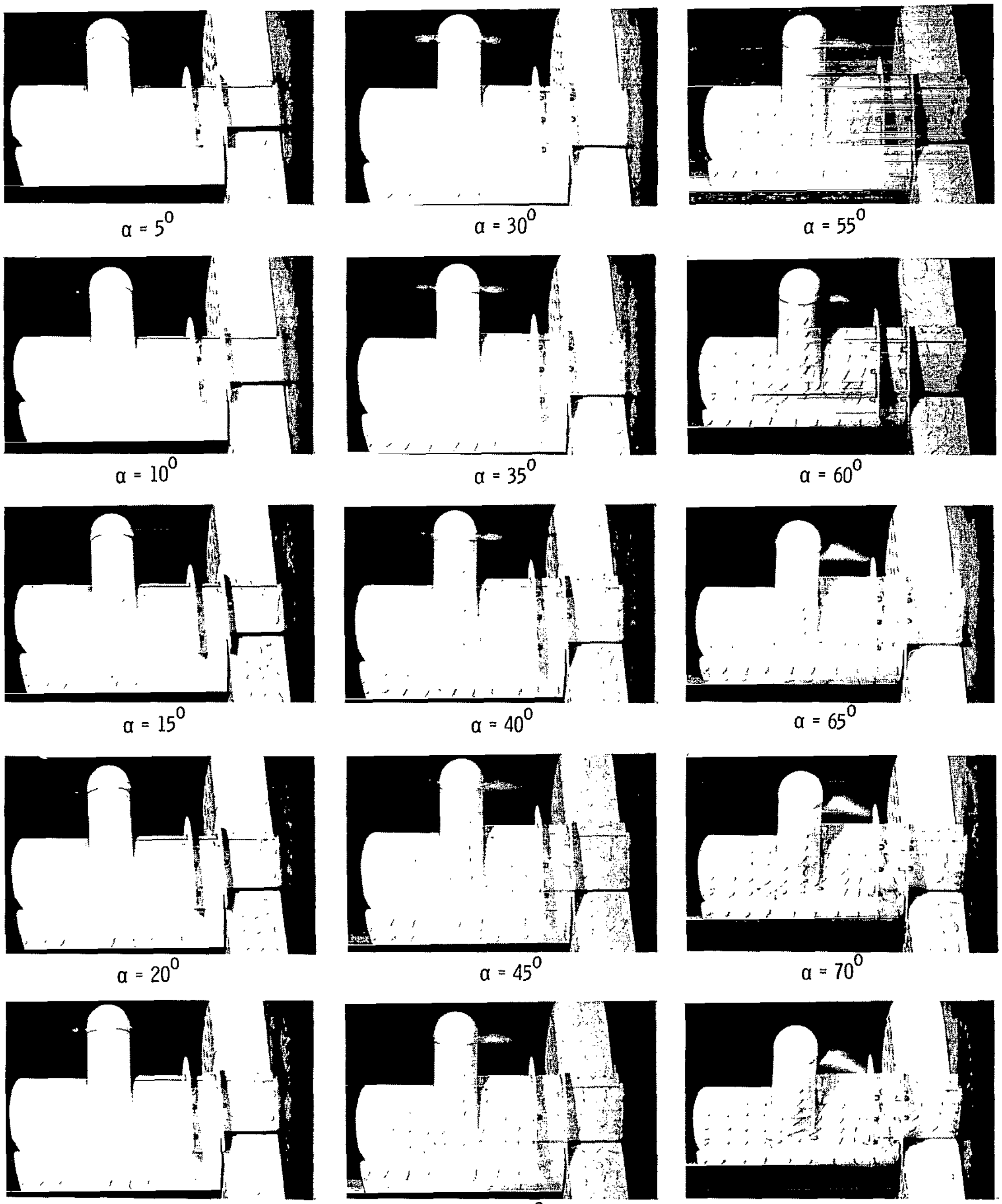
(a) Aerodynamic characteristics.

Figure 11.- Aerodynamic and flow characteristics of the wing with propeller rotation up at the tip. Inboard slat on; fences on; $\delta_f = 20^0$.



(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 11.- Continued.



$\alpha = 5^0$ $\alpha = 30^0$ $\alpha = 55^0$

$\alpha = 10^0$ $\alpha = 35^0$ $\alpha = 60^0$

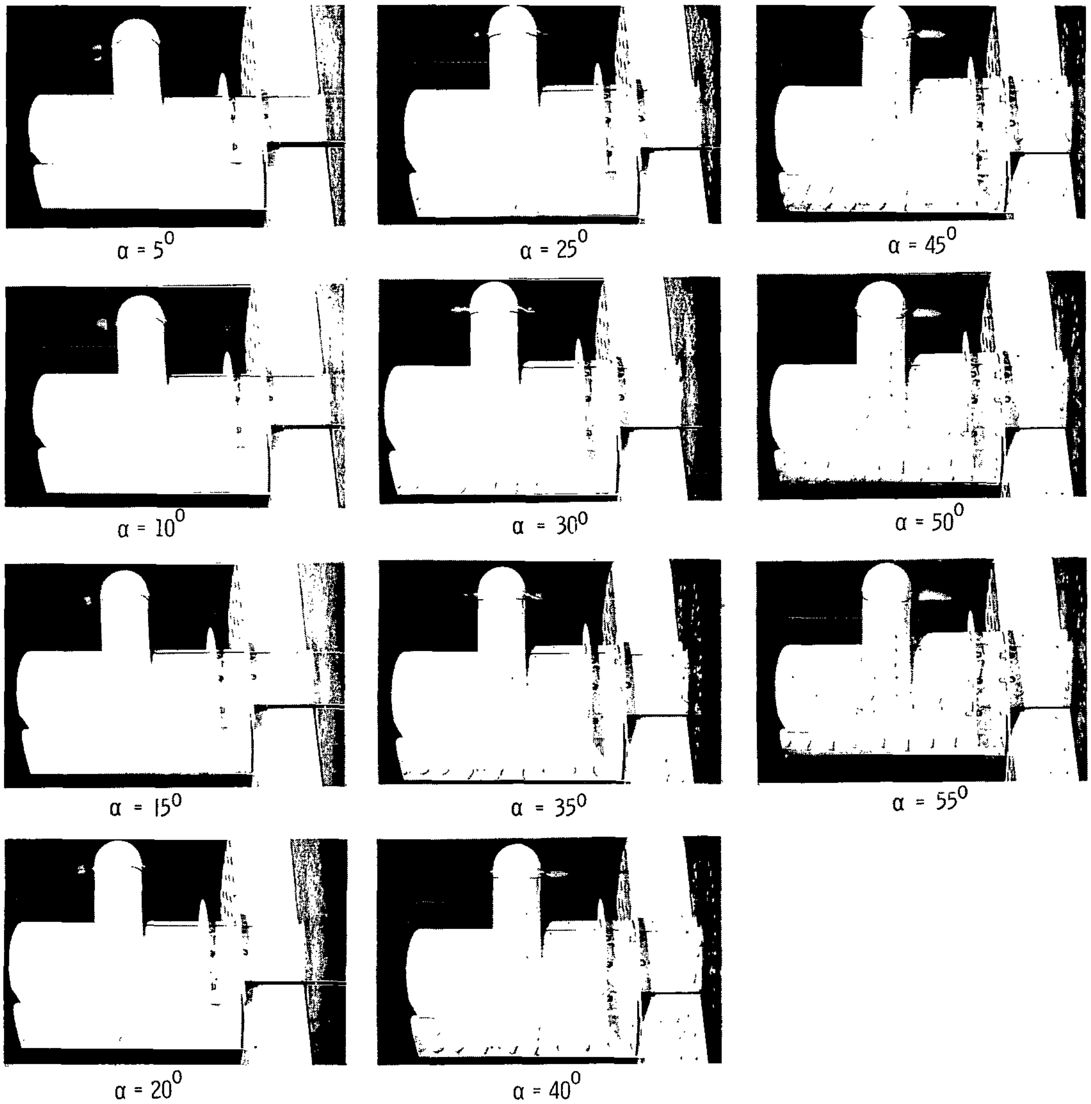
$\alpha = 15^0$ $\alpha = 40^0$ $\alpha = 65^0$

$\alpha = 20^0$ $\alpha = 45^0$ $\alpha = 70^0$

$\alpha = 25^0$ $\alpha = 50^0$ $\alpha = 75^0$

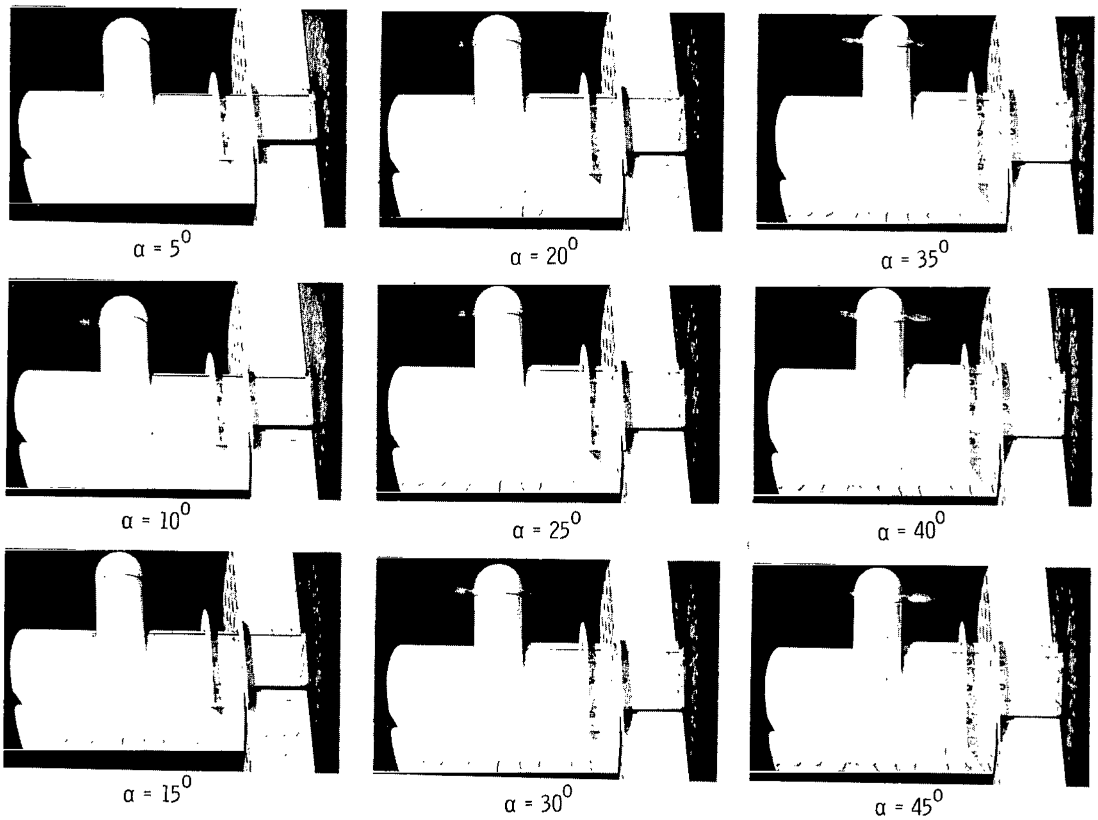
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 11.- Continued.



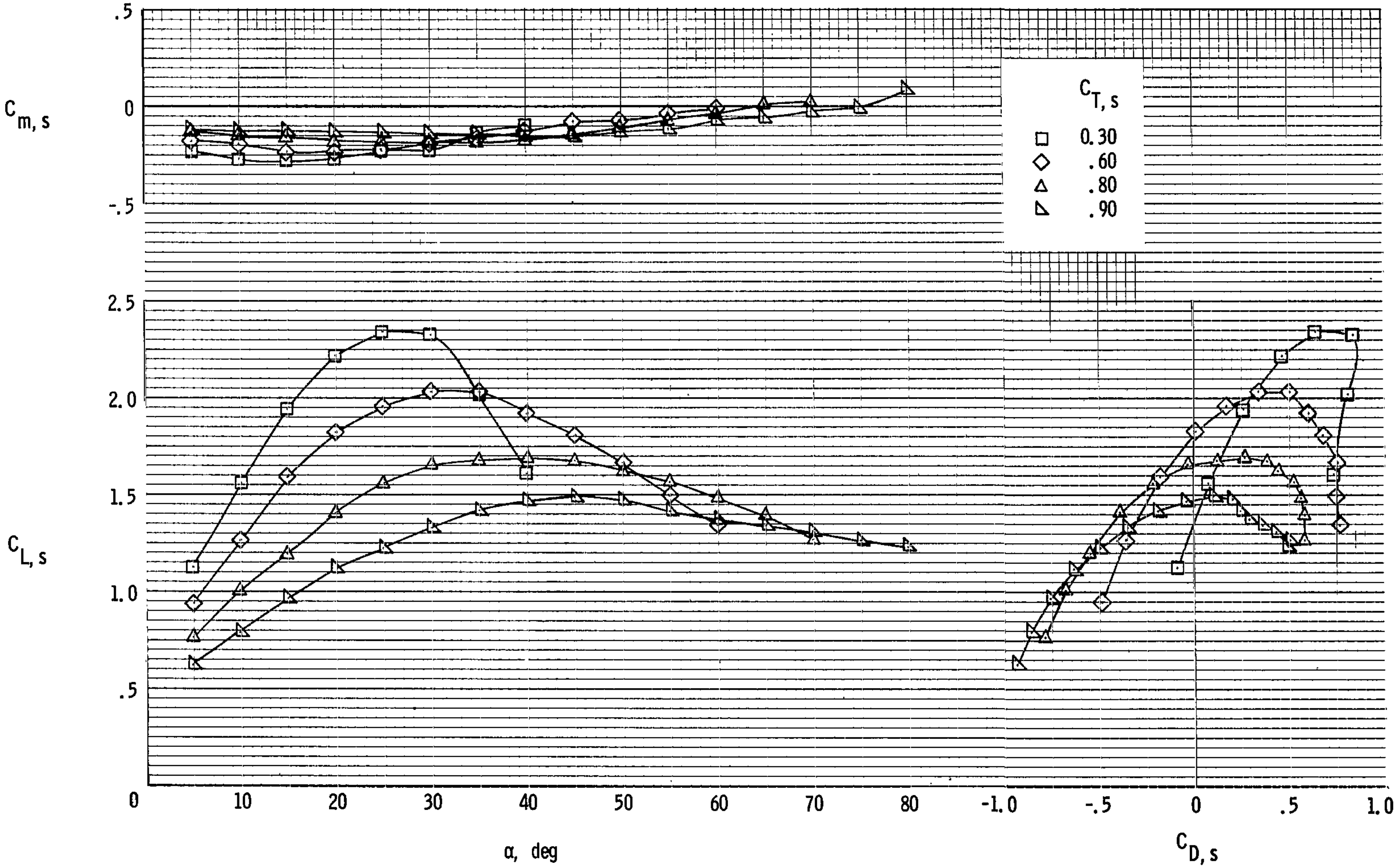
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 11.- Continued.



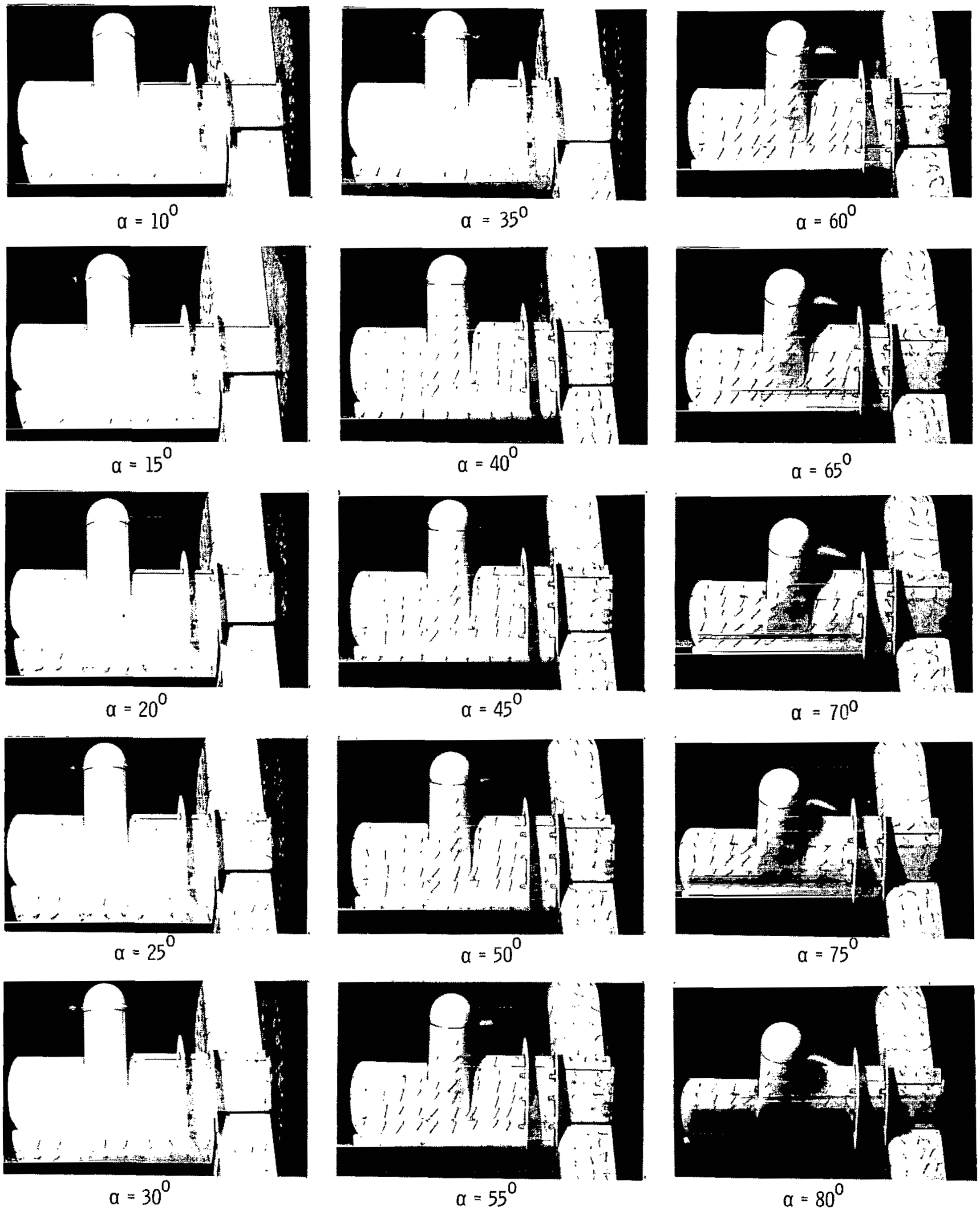
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 11.- Concluded.



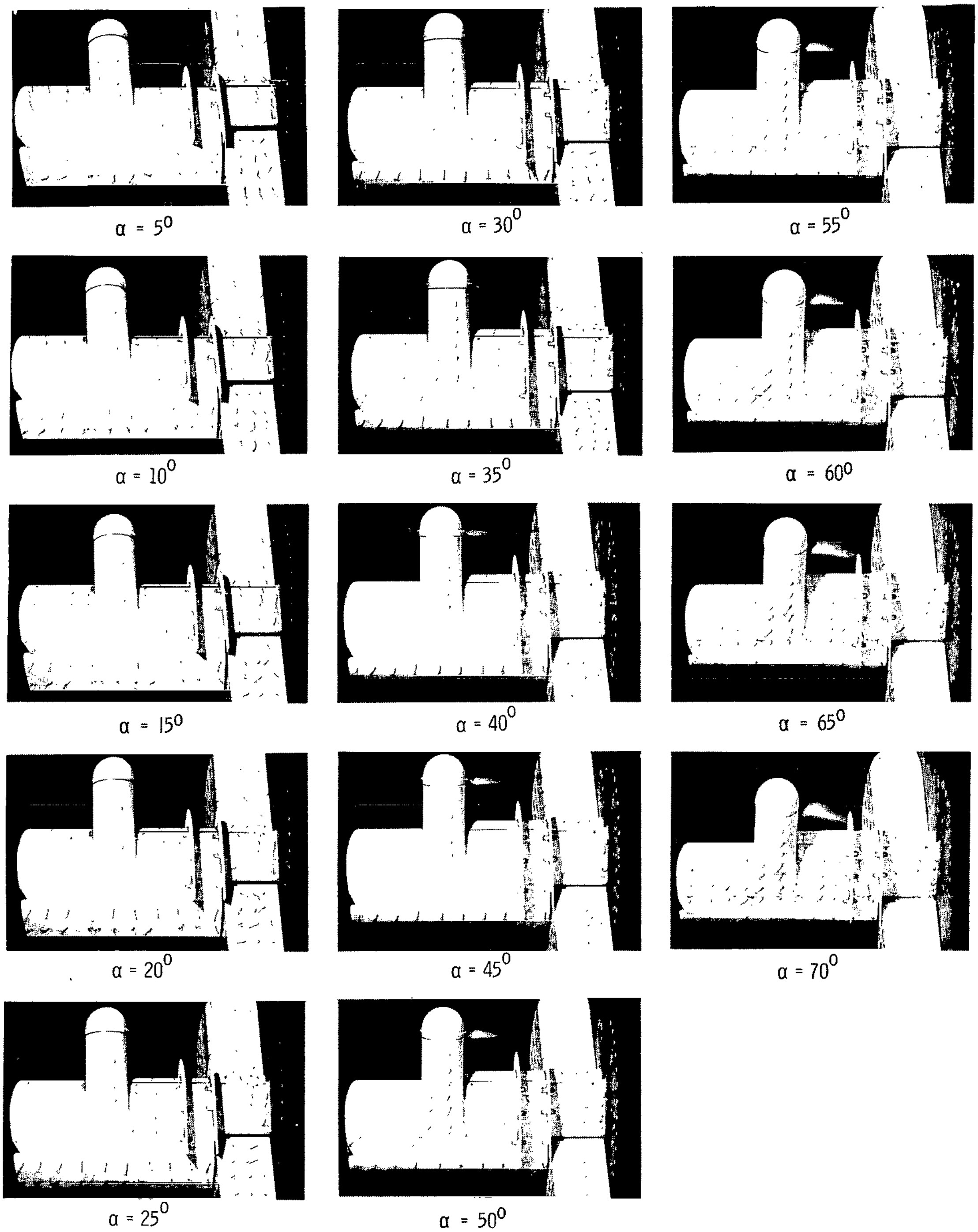
(a) Aerodynamic characteristics.

Figure 12.- Aerodynamic and flow characteristics of the wing with propeller rotation up at the tip. Inboard slat on; fences on; $\delta_f = 40^0$.



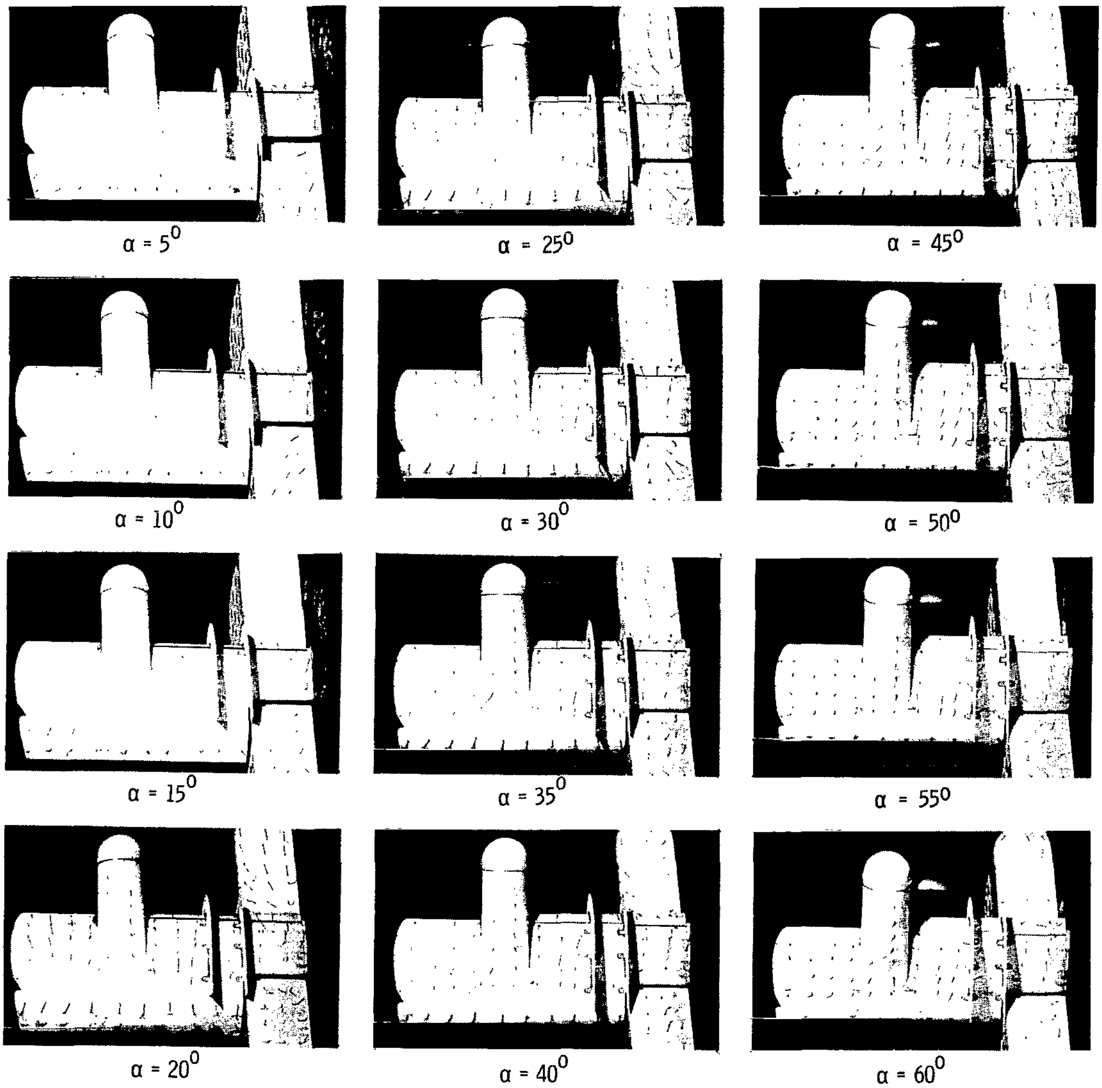
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 12.- Continued.



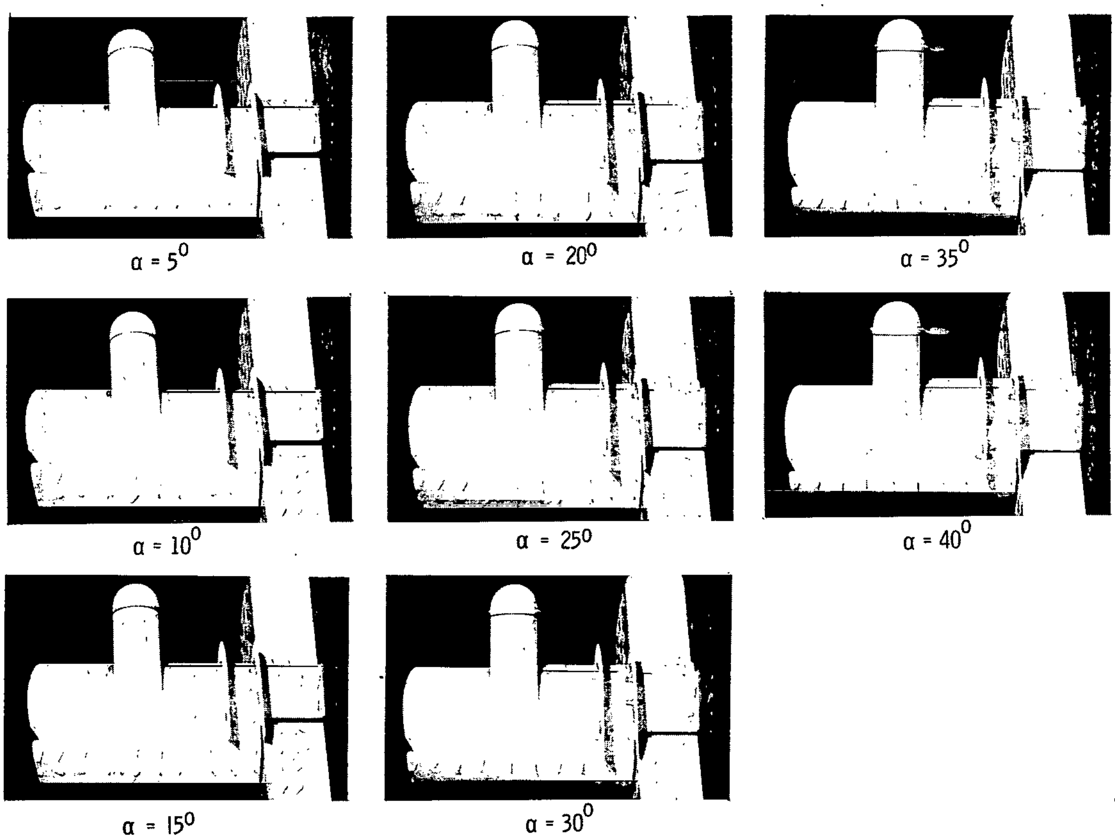
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 12.- Continued.



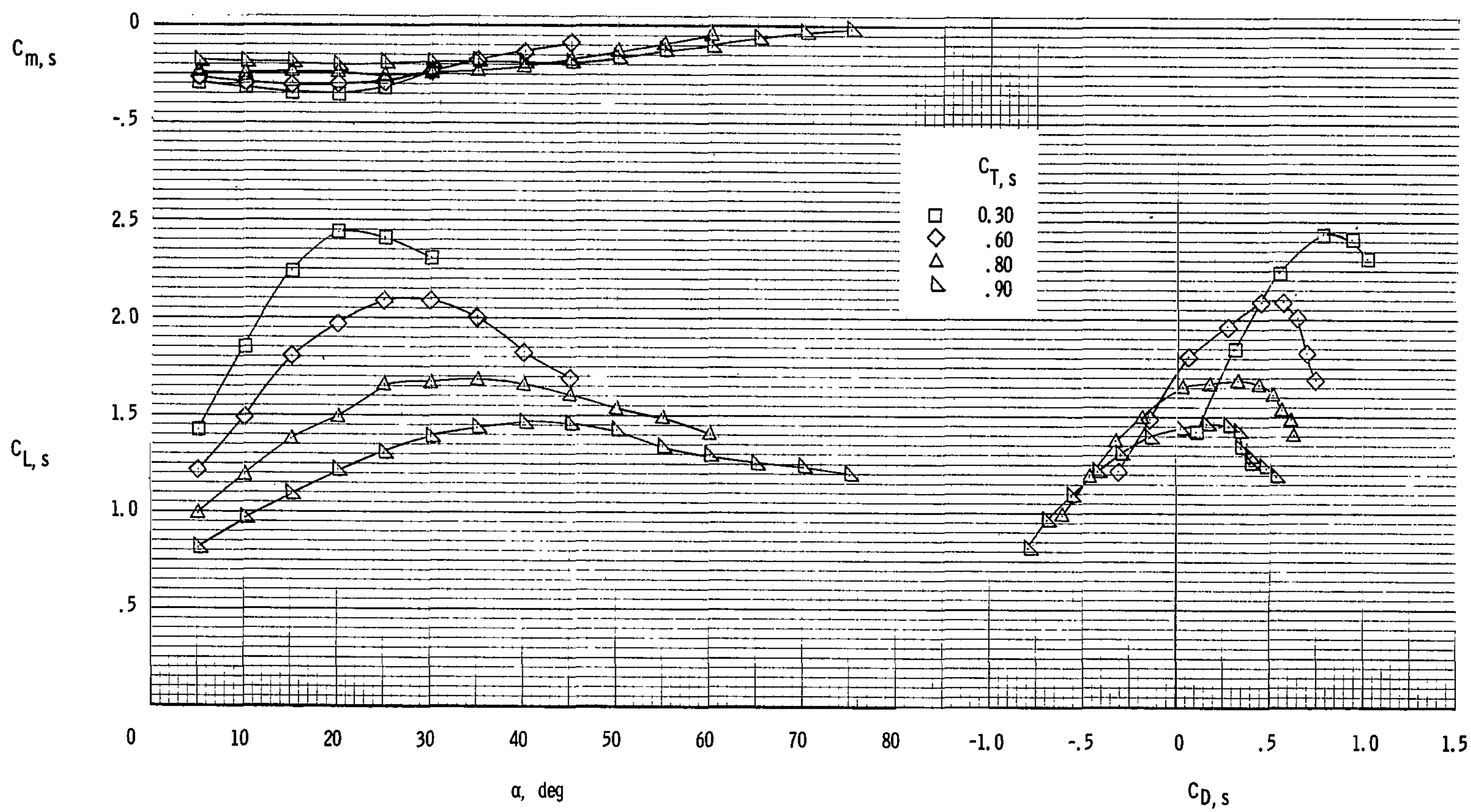
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 12.- Continued.



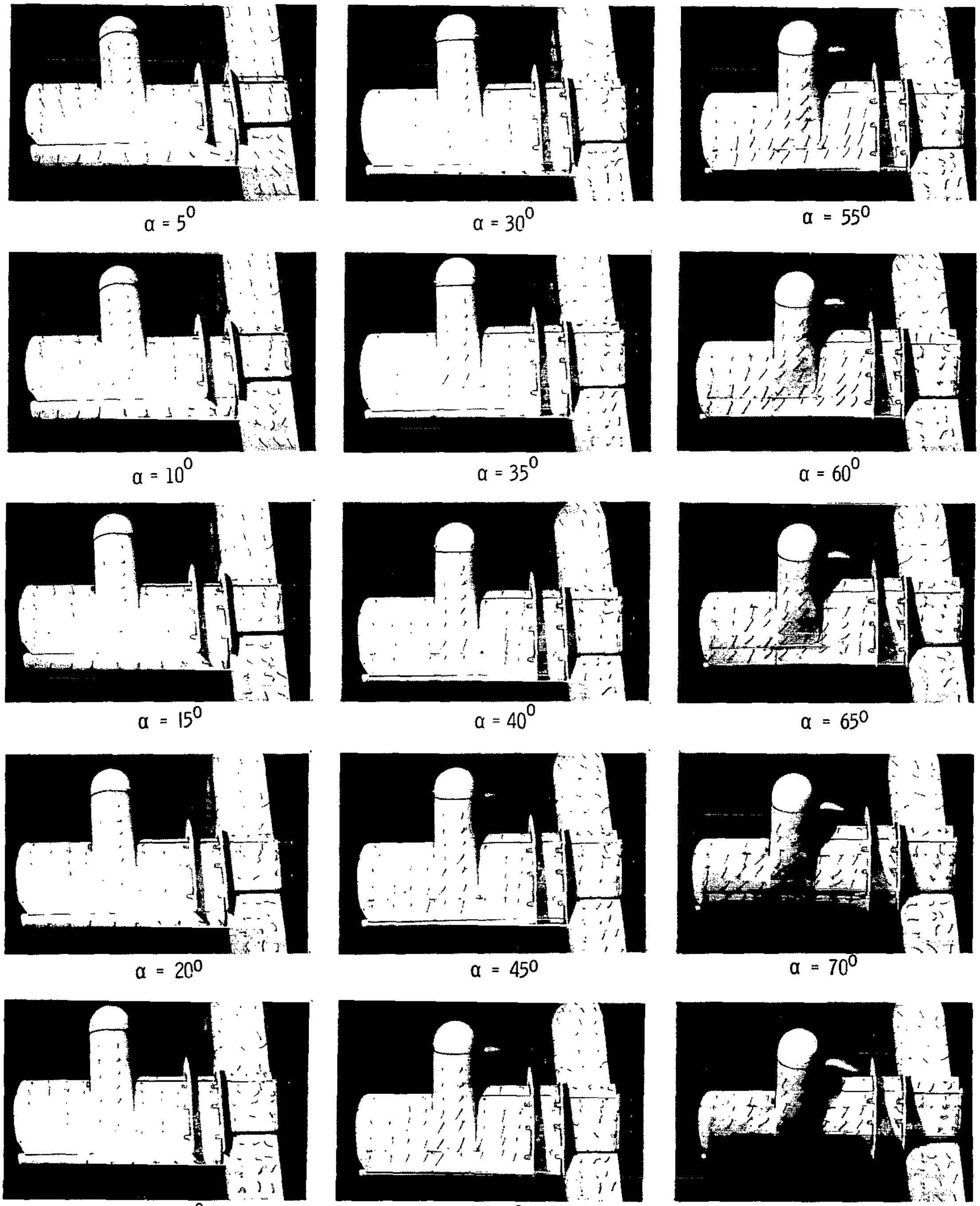
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 12.- Concluded.



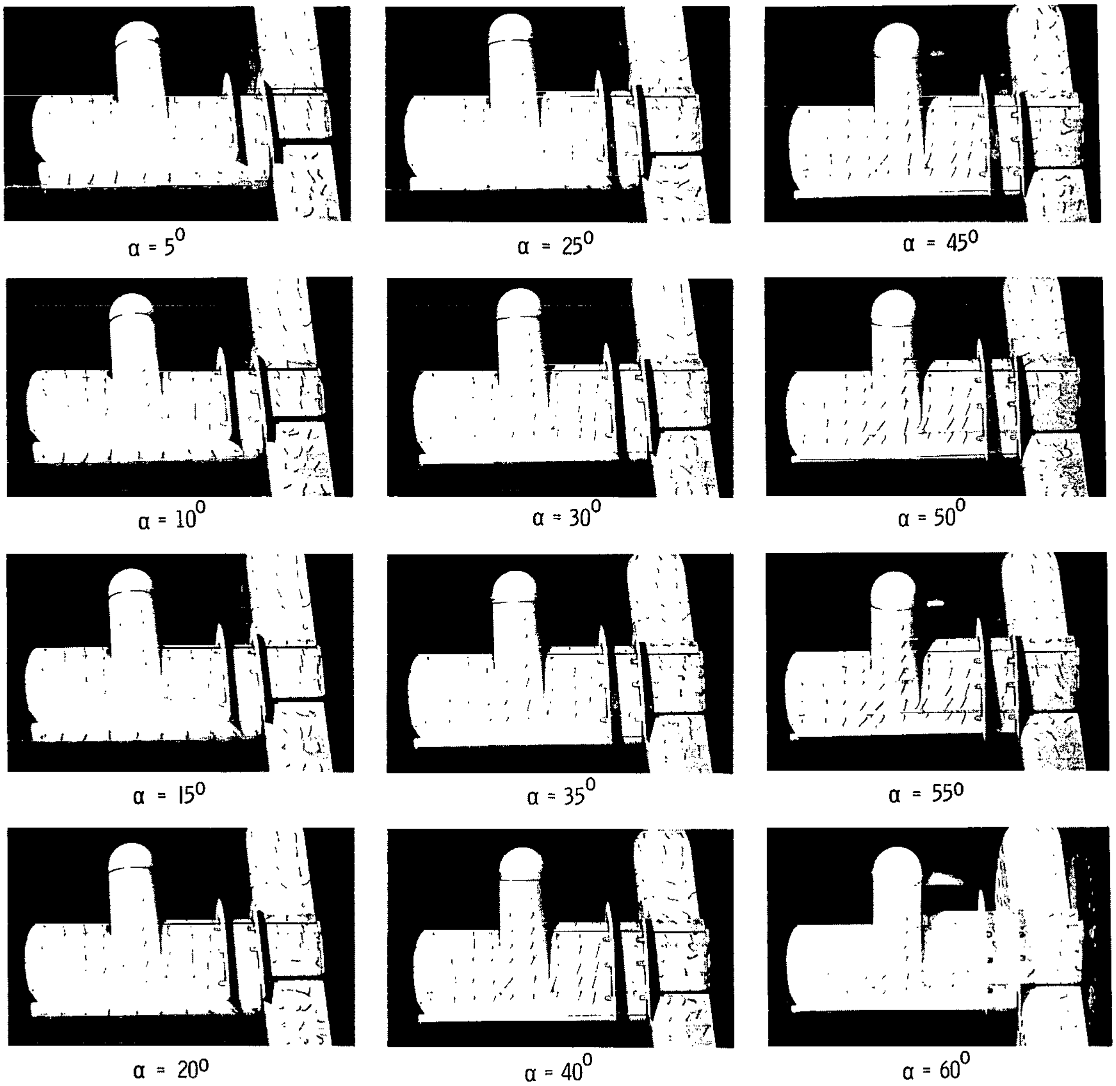
(a) Aerodynamic characteristics.

Figure 13.- Aerodynamic and flow characteristics of the wing with propeller rotation up at the tip. Inboard slat on; fences on; $\delta_f = 60^o$.



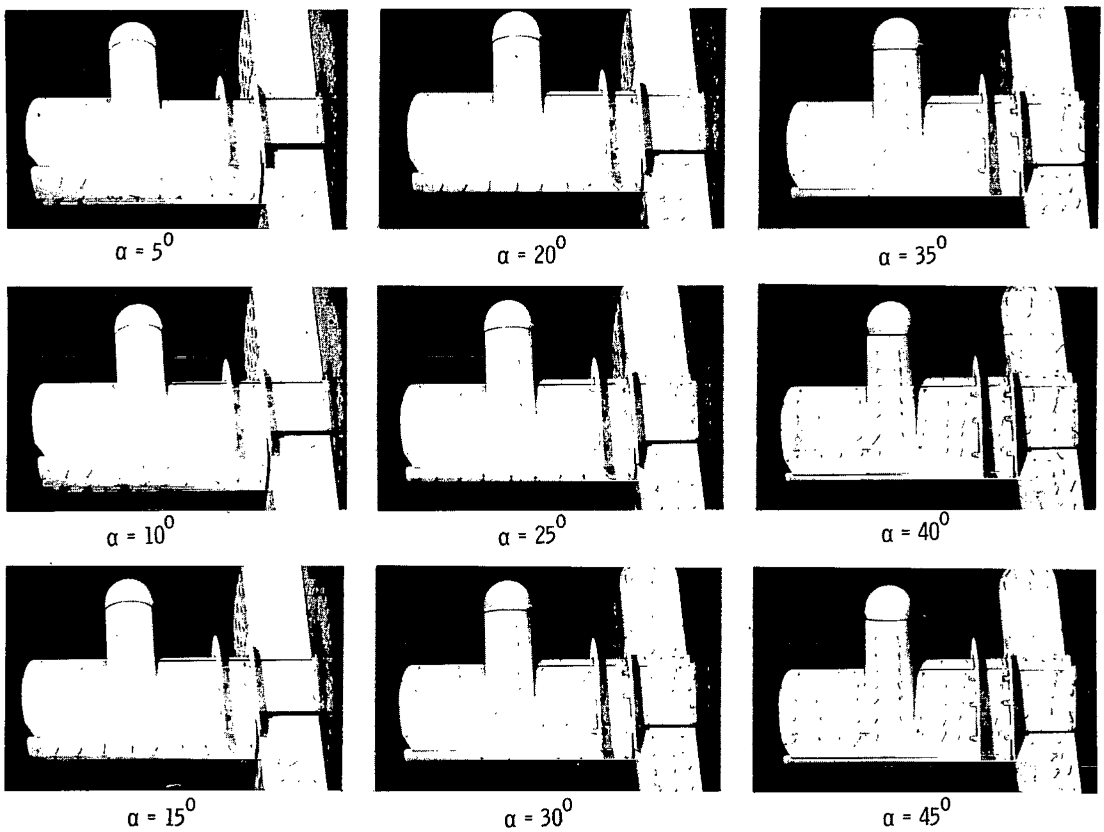
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 13.- Continued.



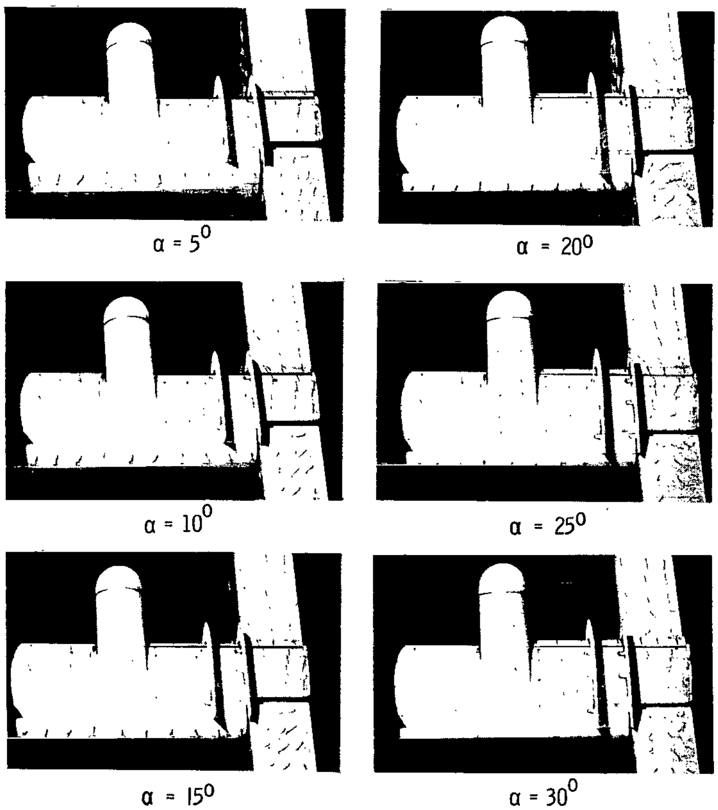
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 13.- Continued.



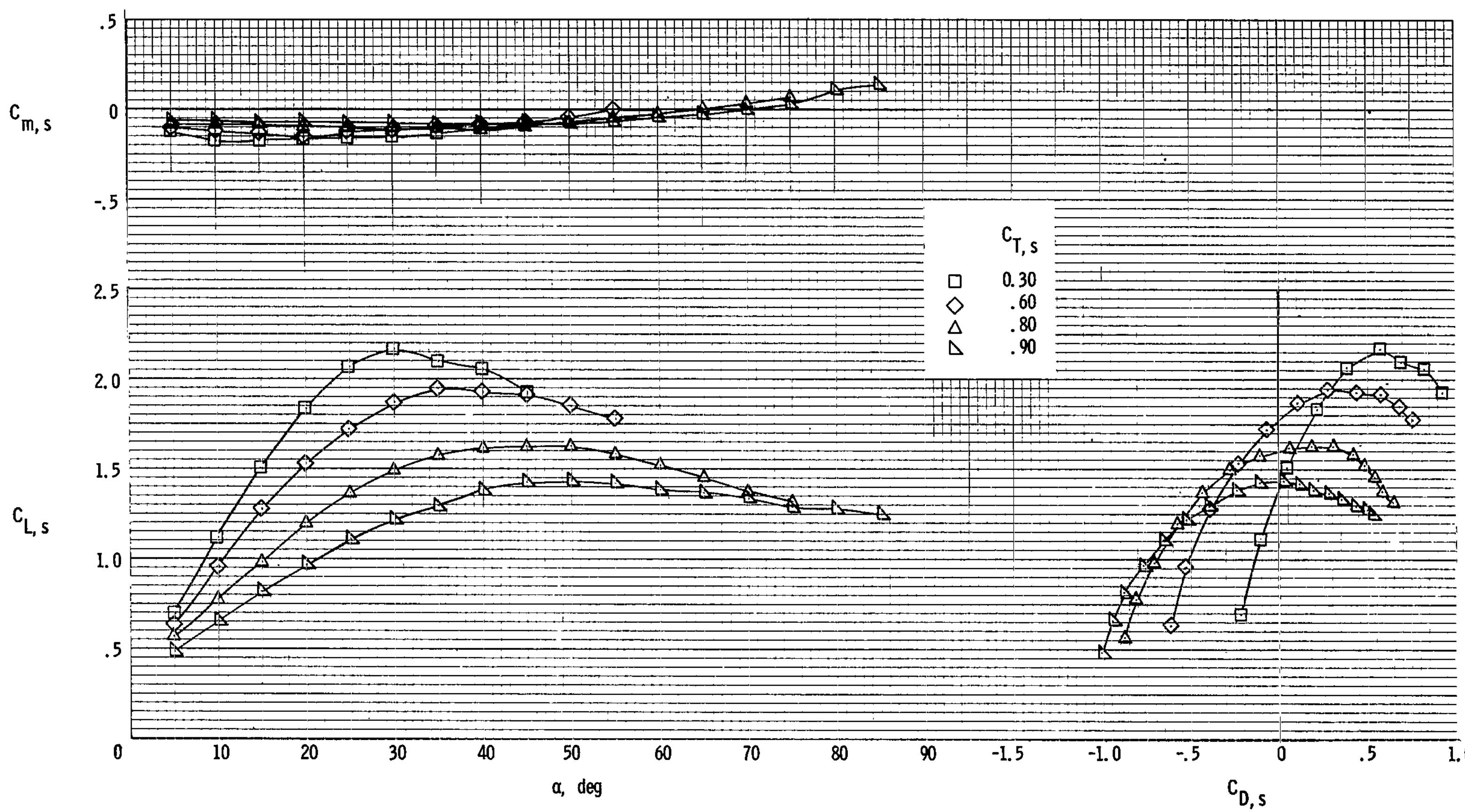
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 13.- Continued.



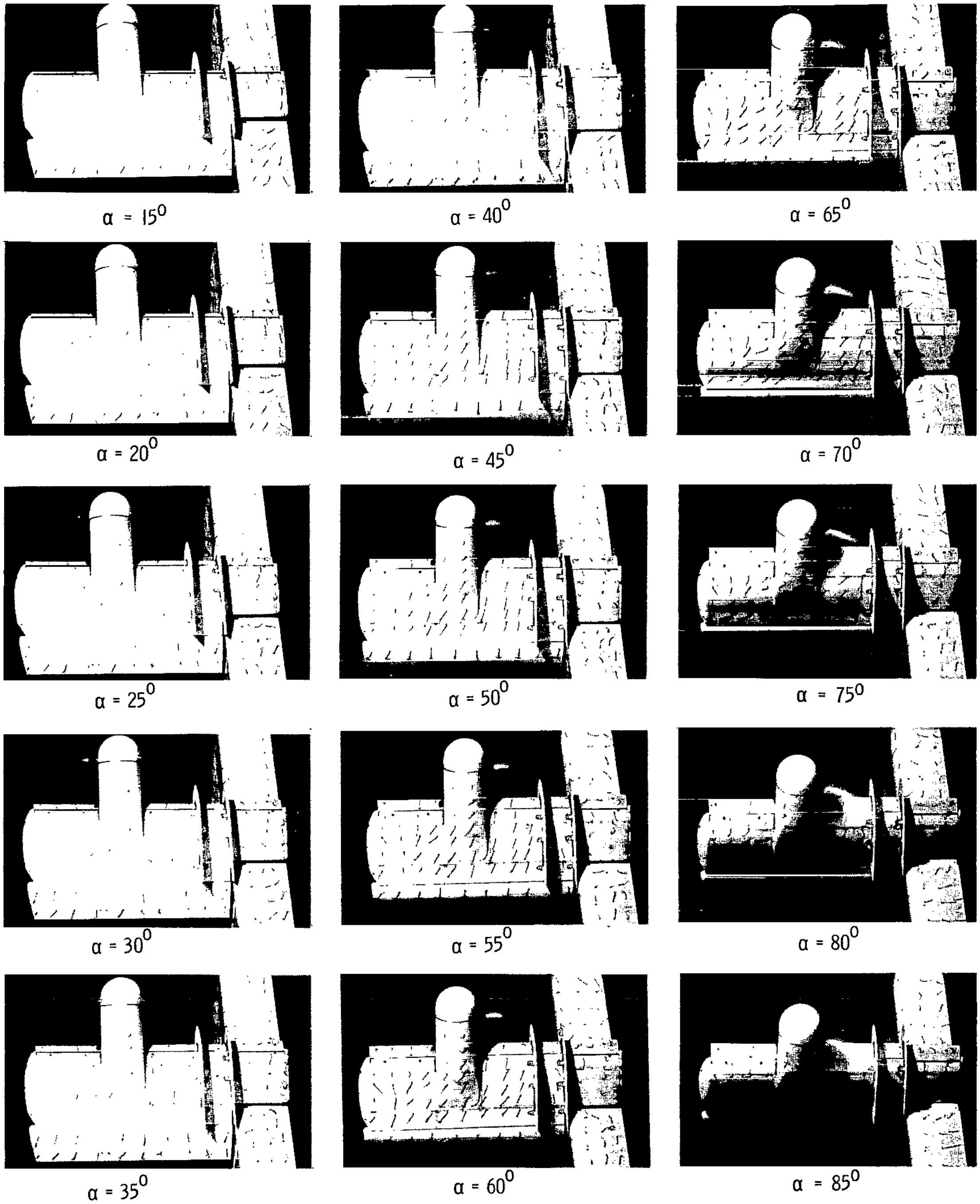
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 13.- Concluded.



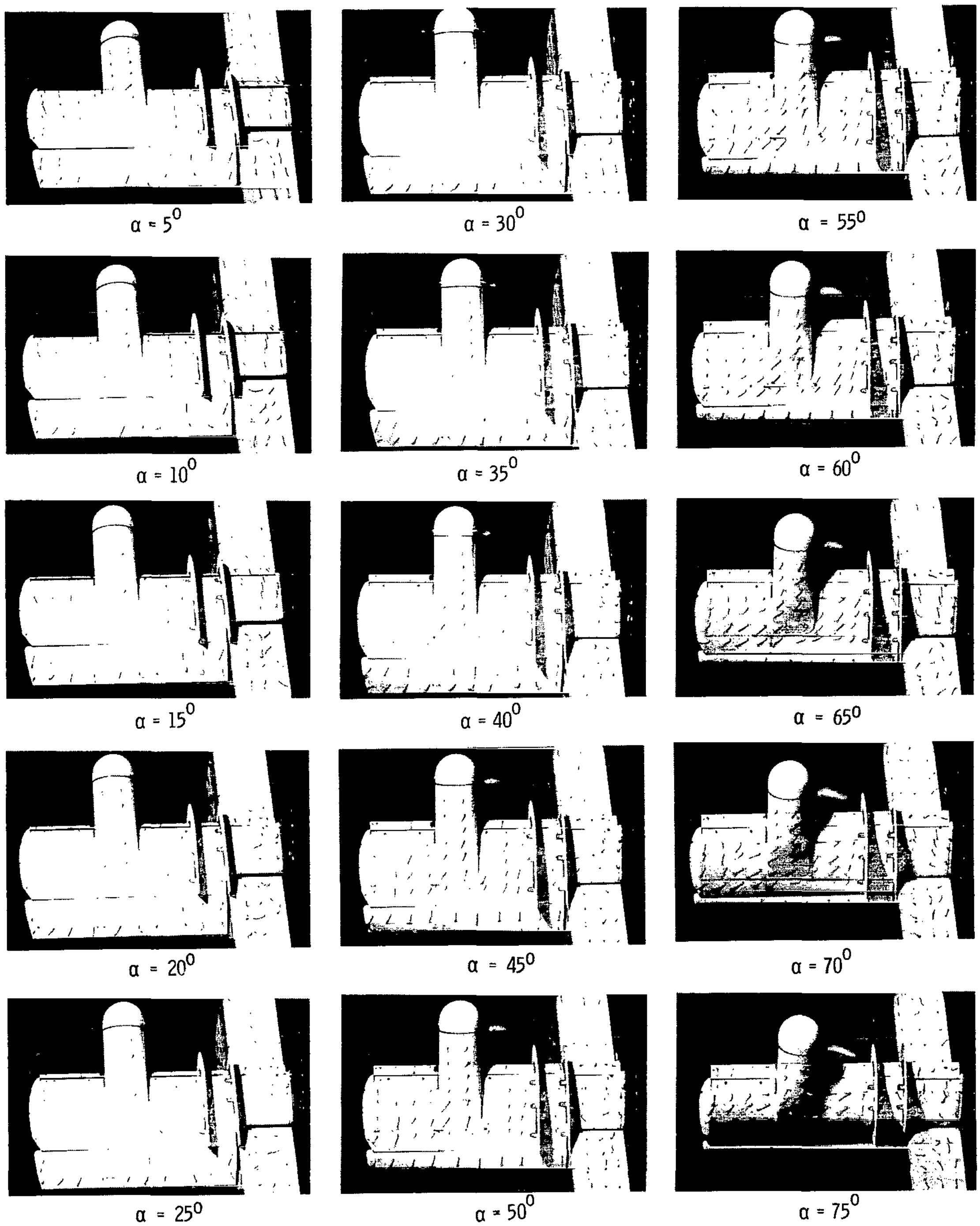
(a) Aerodynamic characteristics.

Figure 14.- Aerodynamic and flow characteristics of the wing with propeller rotation up at the tip. Full-span slat on; fences on; $\delta_f = 20^{\circ}$.



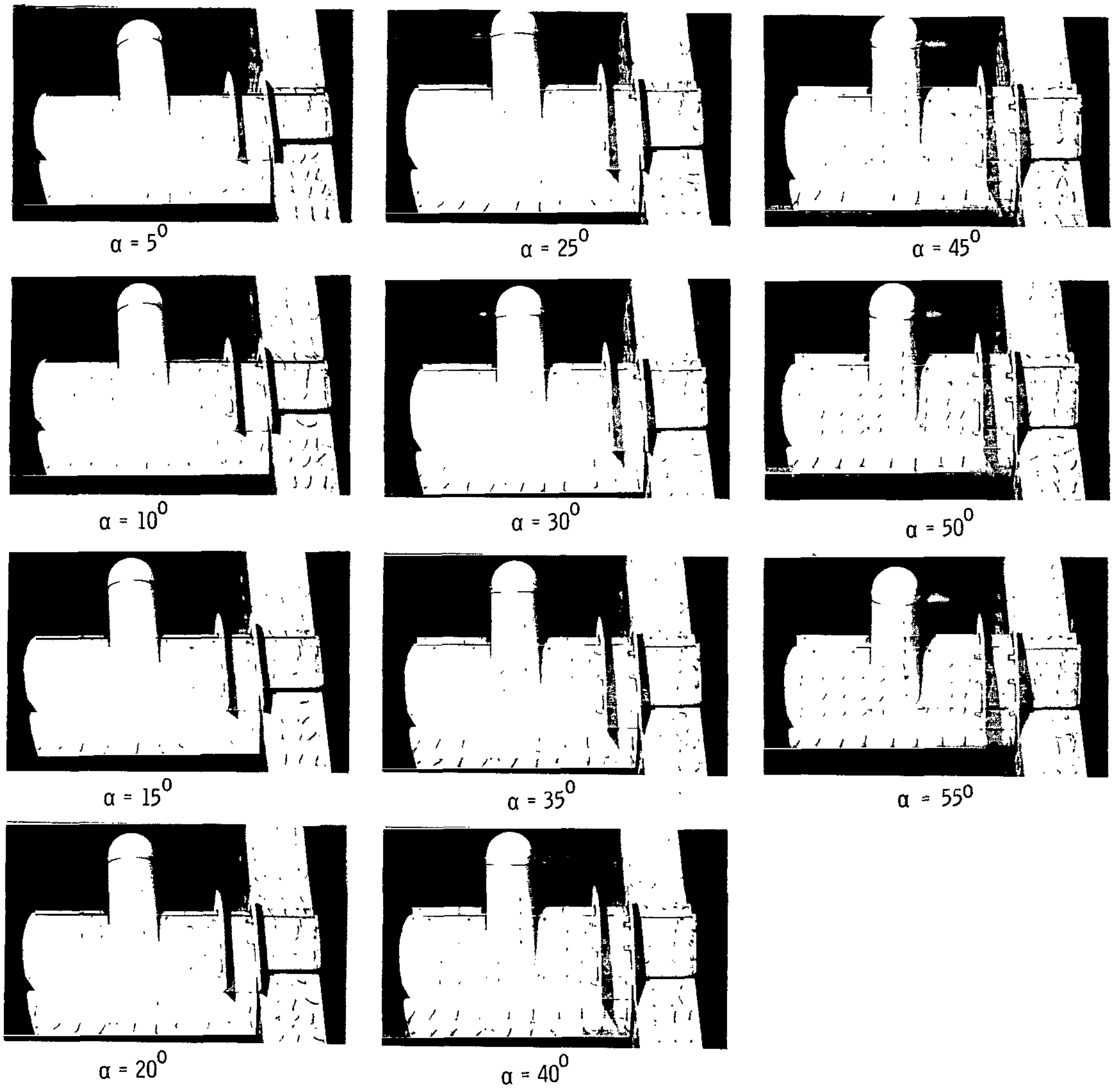
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 14.- Continued.



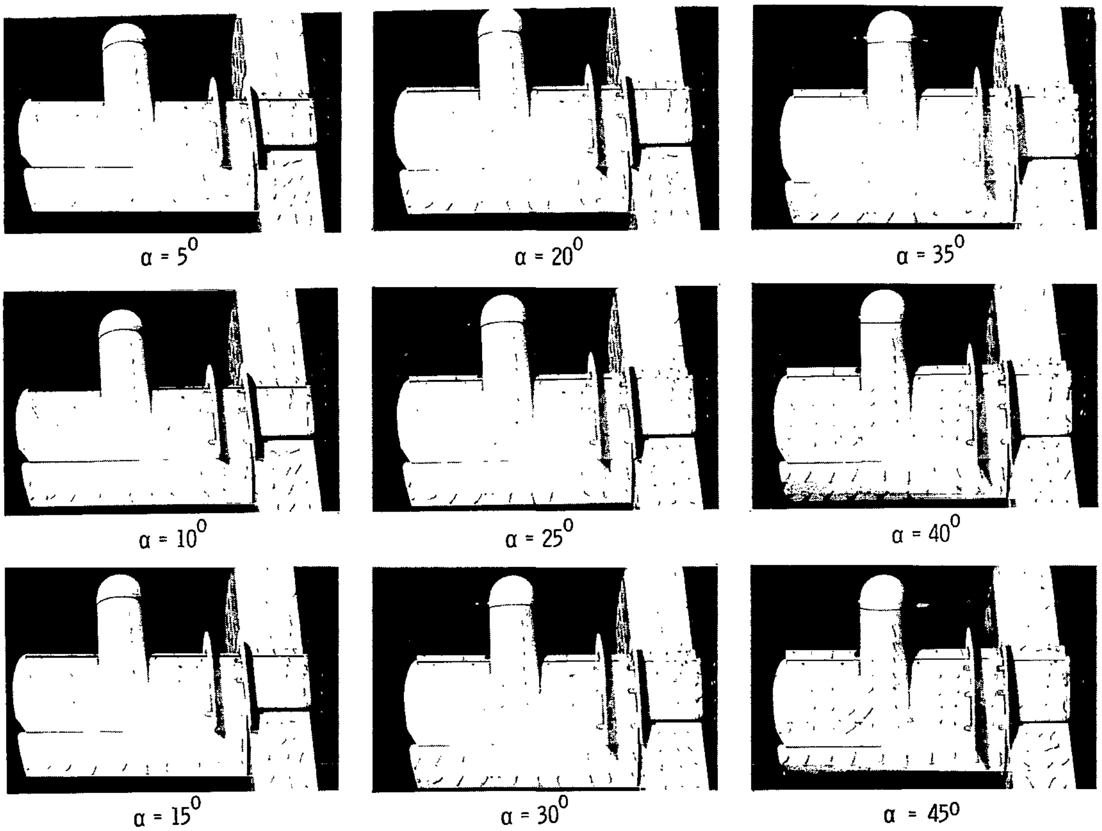
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 14.- Continued.



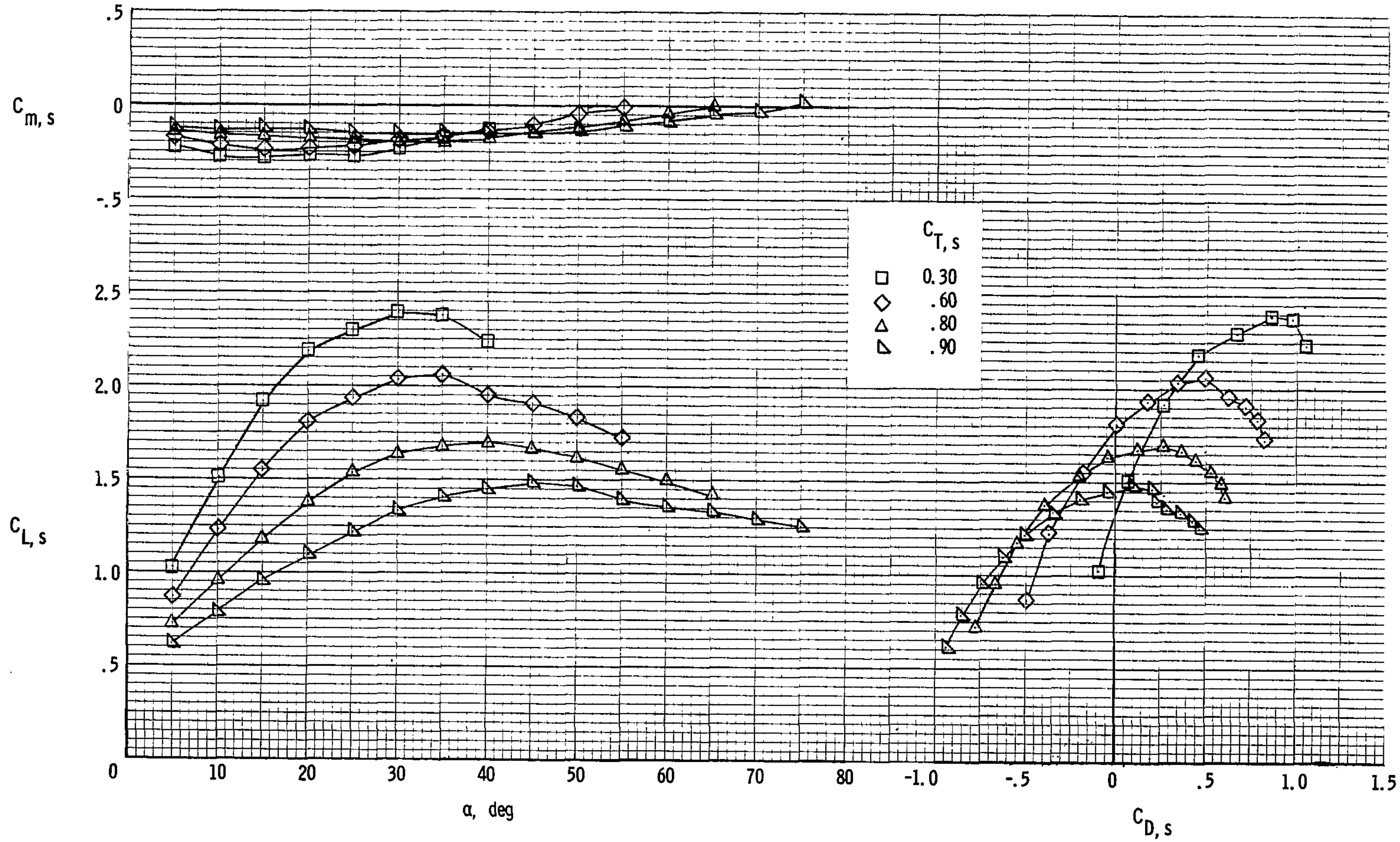
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 14.- Continued.



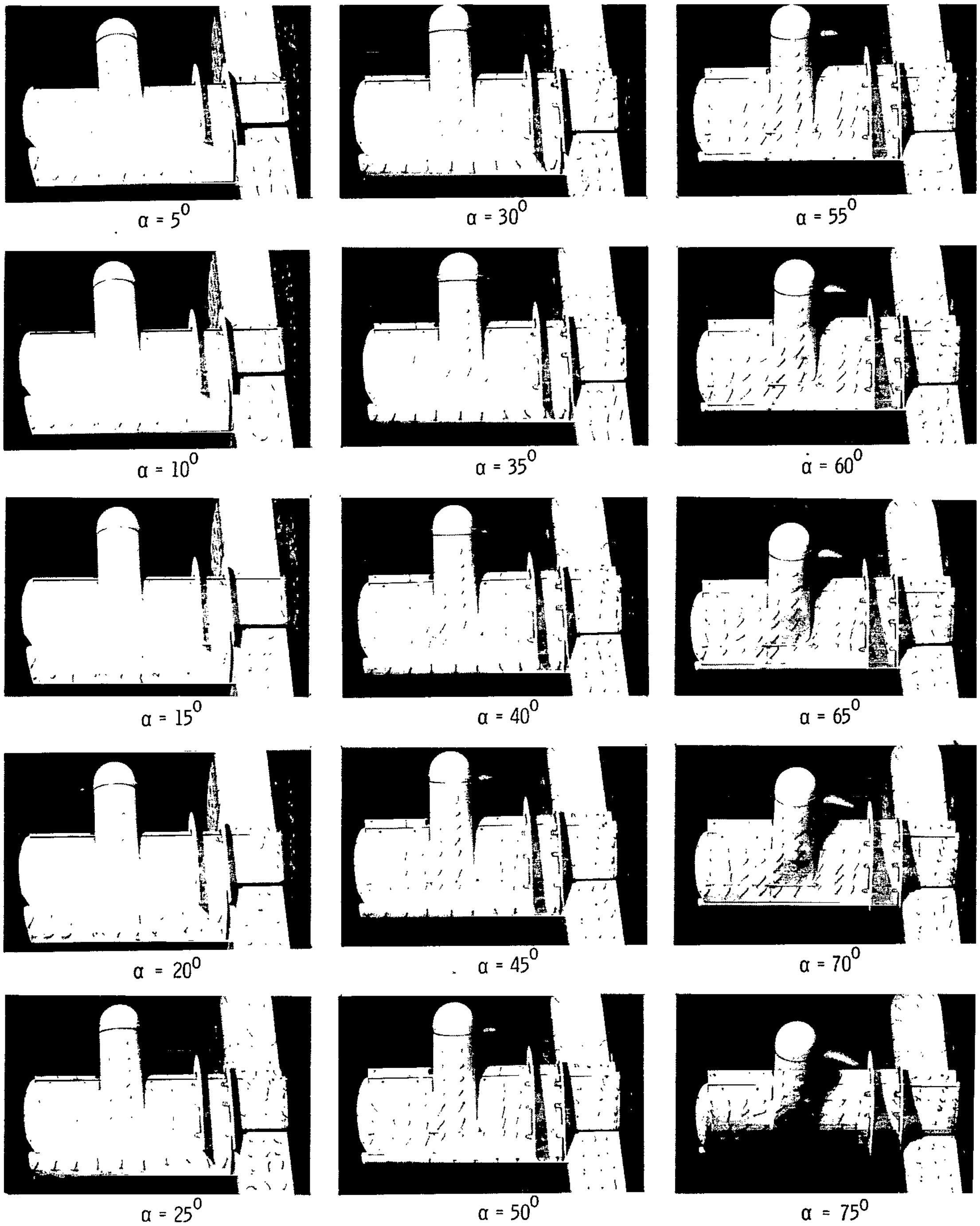
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 14.- Concluded.



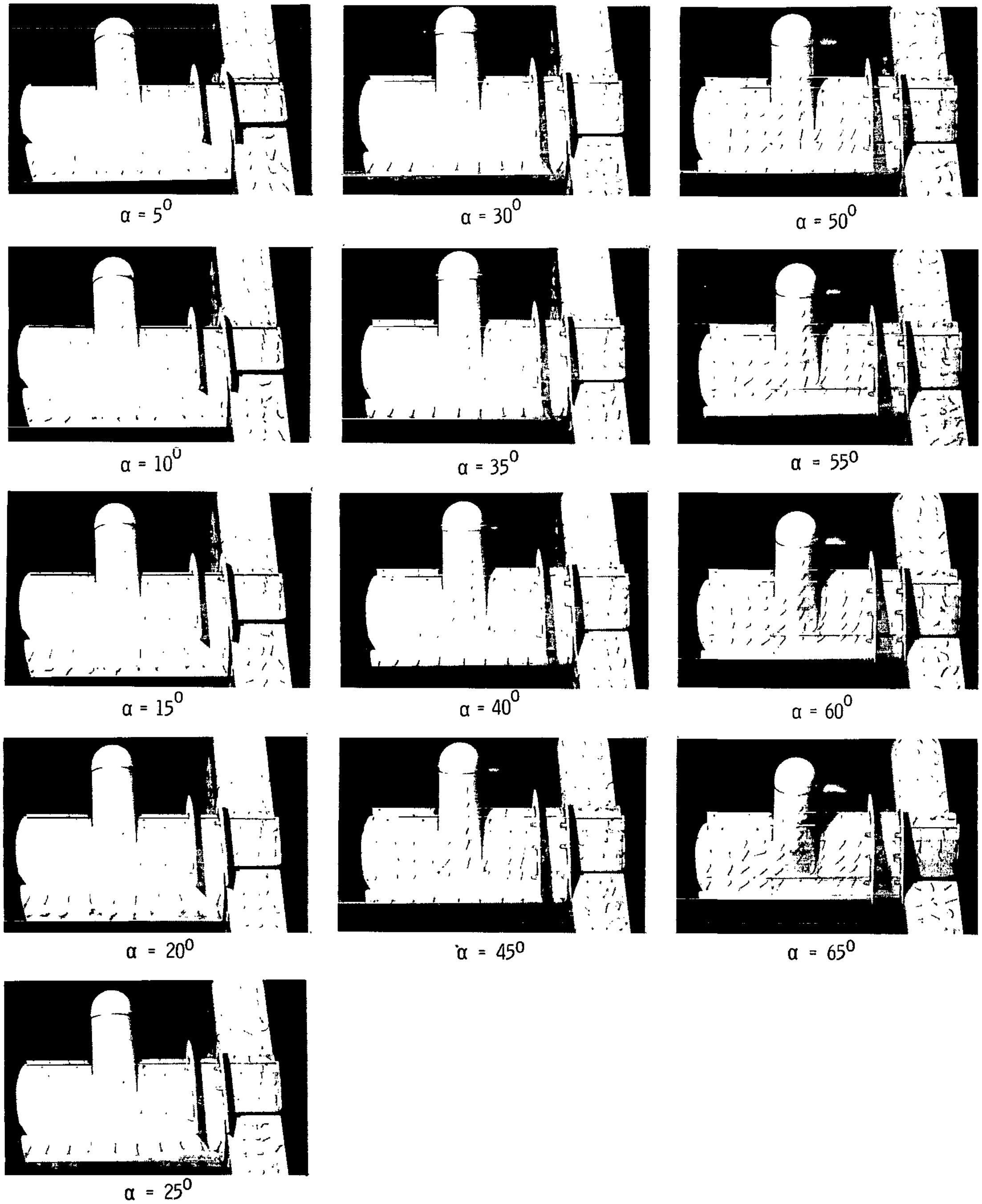
(a) Aerodynamic characteristics.

Figure 15.- Aerodynamic and flow characteristics of the wing with propeller rotation up at the tip.. Full-span slat on; fences on; $\delta_f = 40^0$.



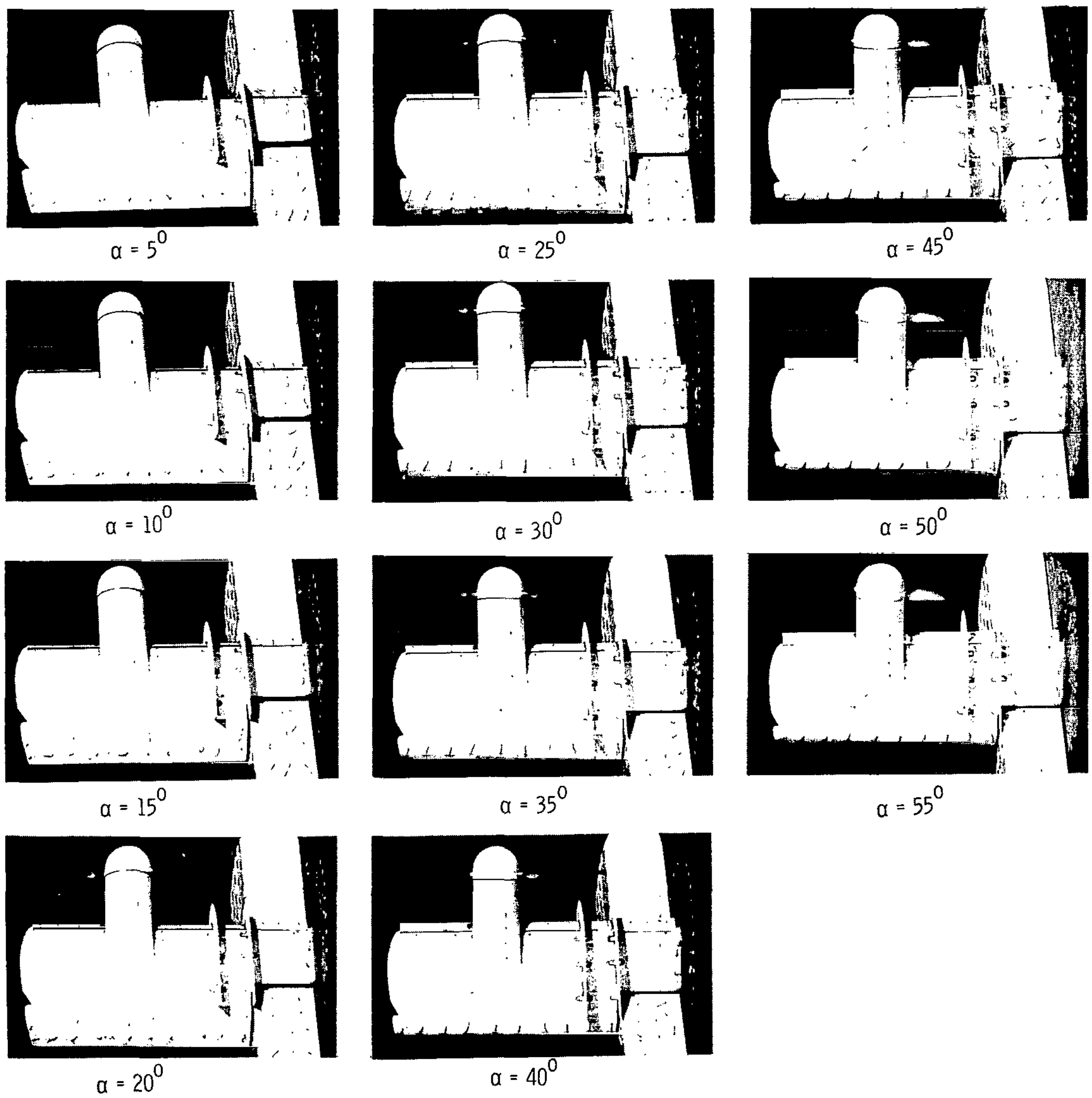
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 15.- Continued.



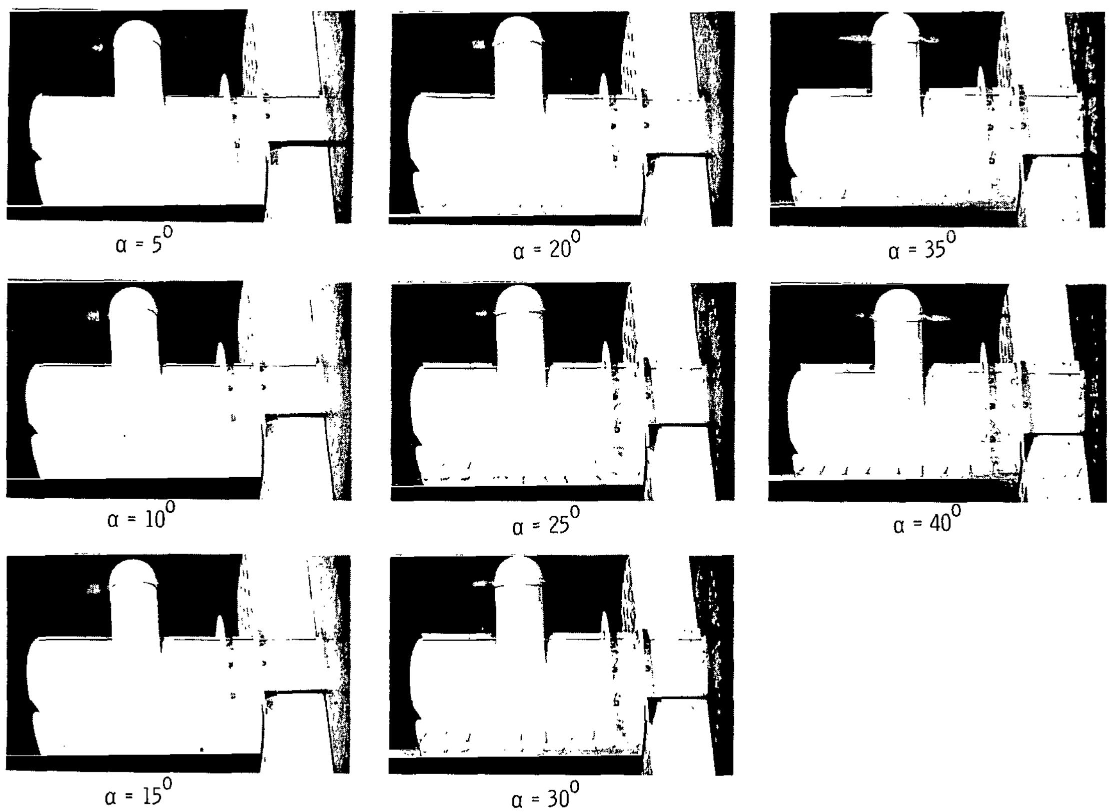
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 15.- Continued.



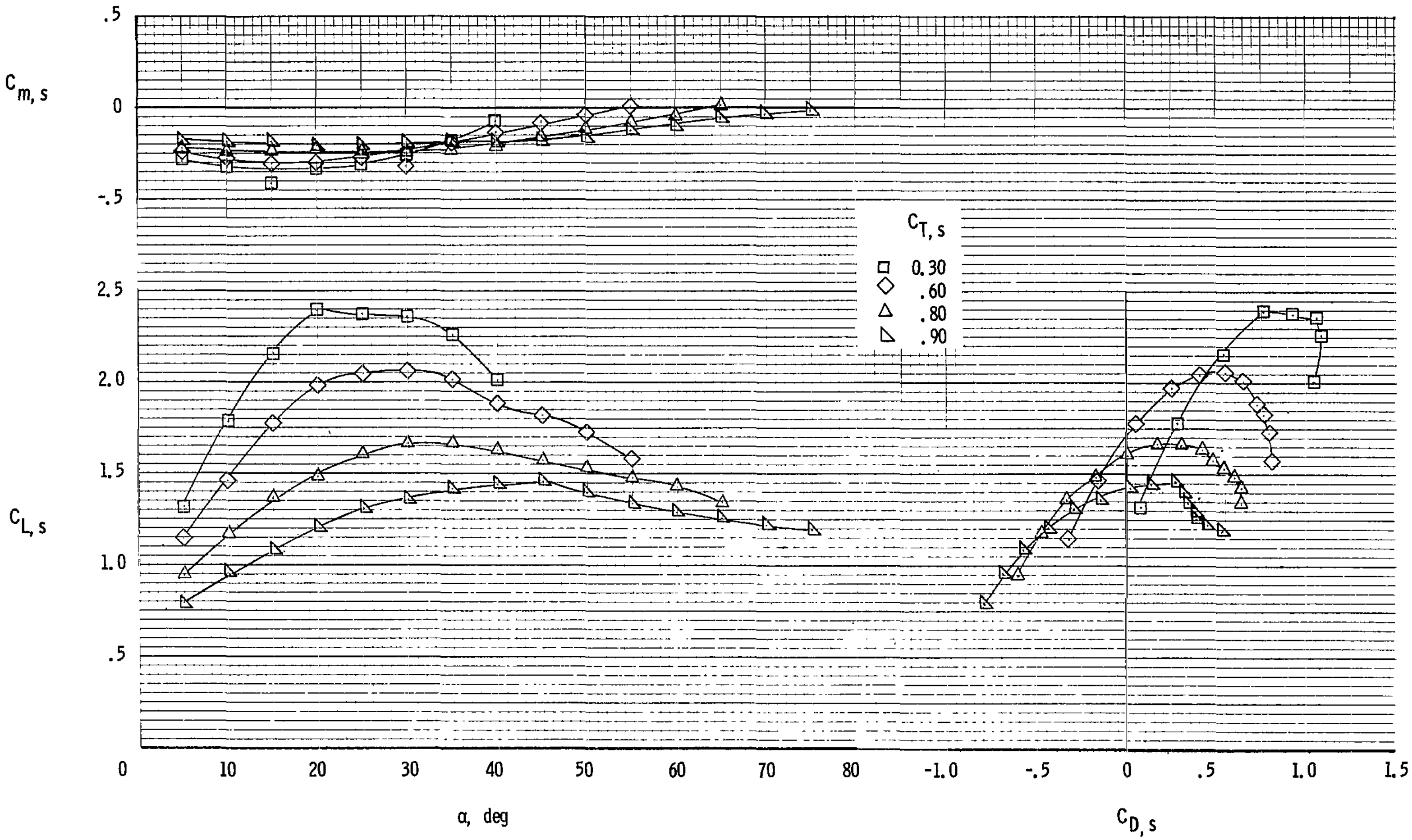
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 15.- Continued.



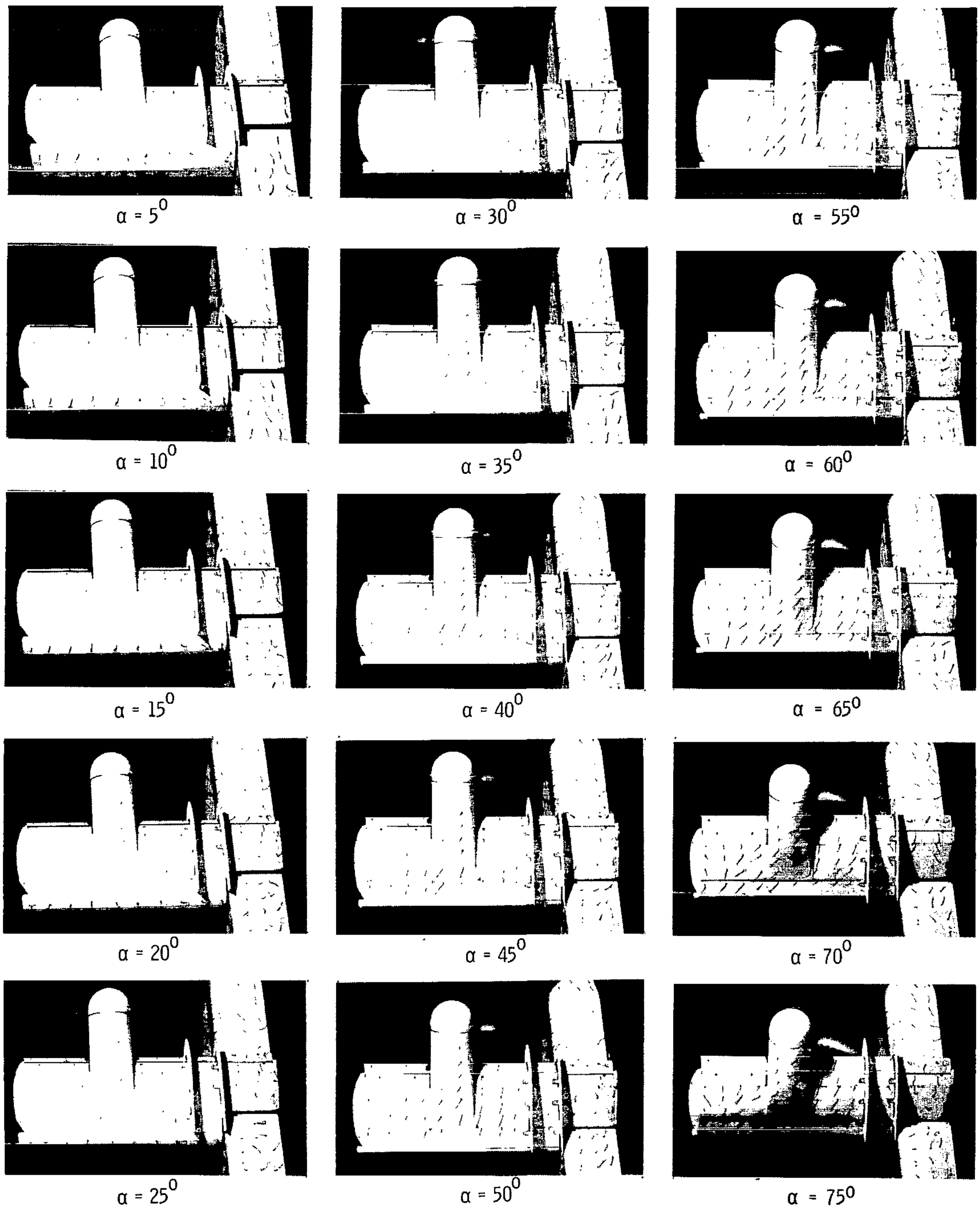
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 15.- Concluded.



(a) Aerodynamic characteristics.

Figure 16.- Aerodynamic and flow characteristics of the wing with propeller rotation up at the tip. Full-span slat on; fences on; $\delta_f = 60^0$.



$\alpha = 5^0$ $\alpha = 30^0$ $\alpha = 55^0$

$\alpha = 10^0$ $\alpha = 35^0$ $\alpha = 60^0$

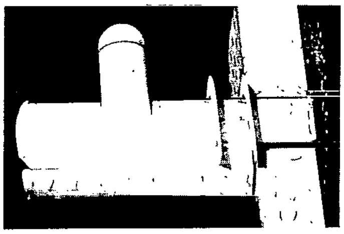
$\alpha = 15^0$ $\alpha = 40^0$ $\alpha = 65^0$

$\alpha = 20^0$ $\alpha = 45^0$ $\alpha = 70^0$

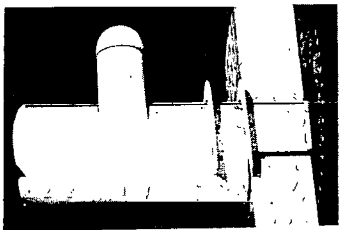
$\alpha = 25^0$ $\alpha = 50^0$ $\alpha = 75^0$

(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 16.- Continued.

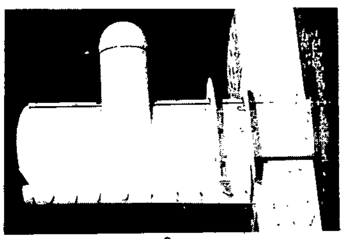


$\alpha = 5^0$



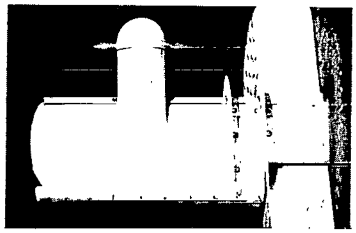
$\alpha = 10^0$

$\alpha = 15^0$



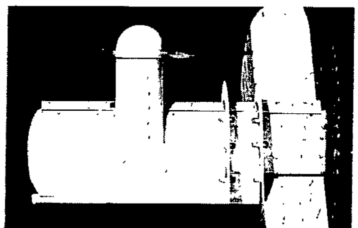
$\alpha = 20^0$

$\alpha = 25^0$



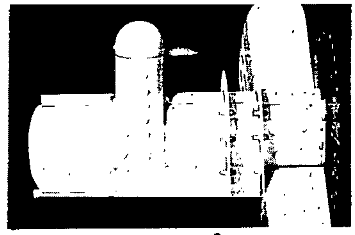
$\alpha = 30^0$

$\alpha = 35^0$

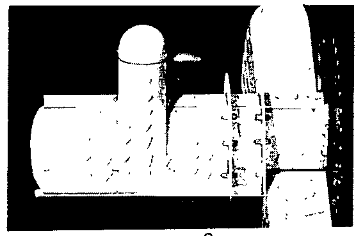


$\alpha = 40^0$

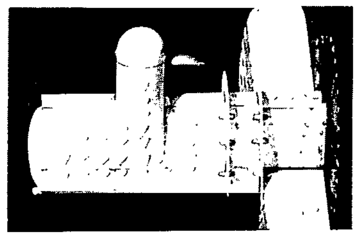
$\alpha = 45^0$



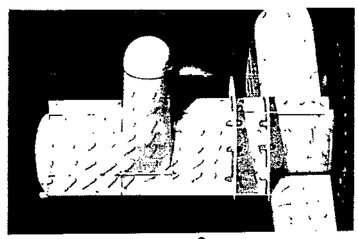
$\alpha = 50^0$



$\alpha = 55^0$



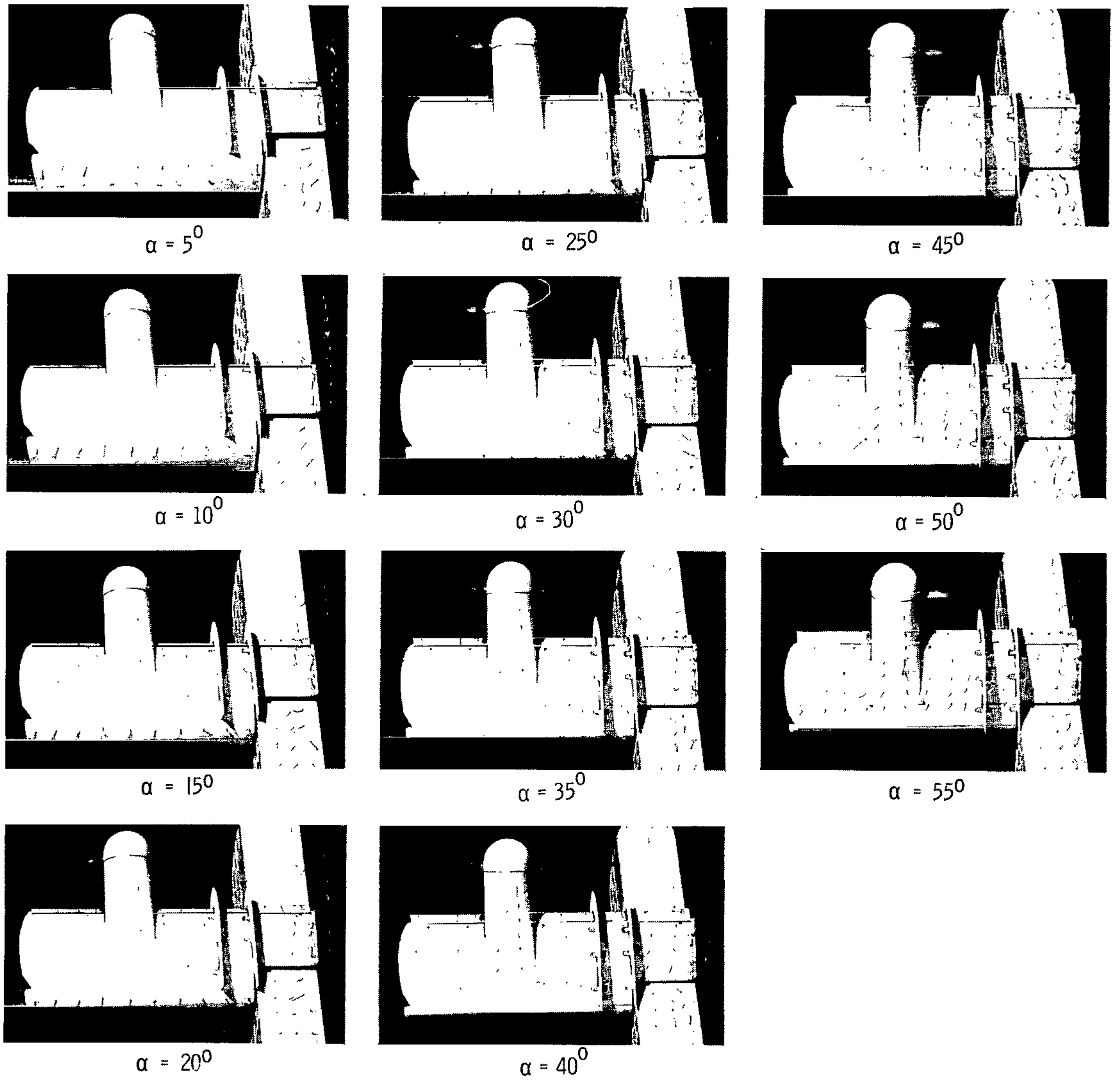
$\alpha = 60^0$



$\alpha = 65^0$

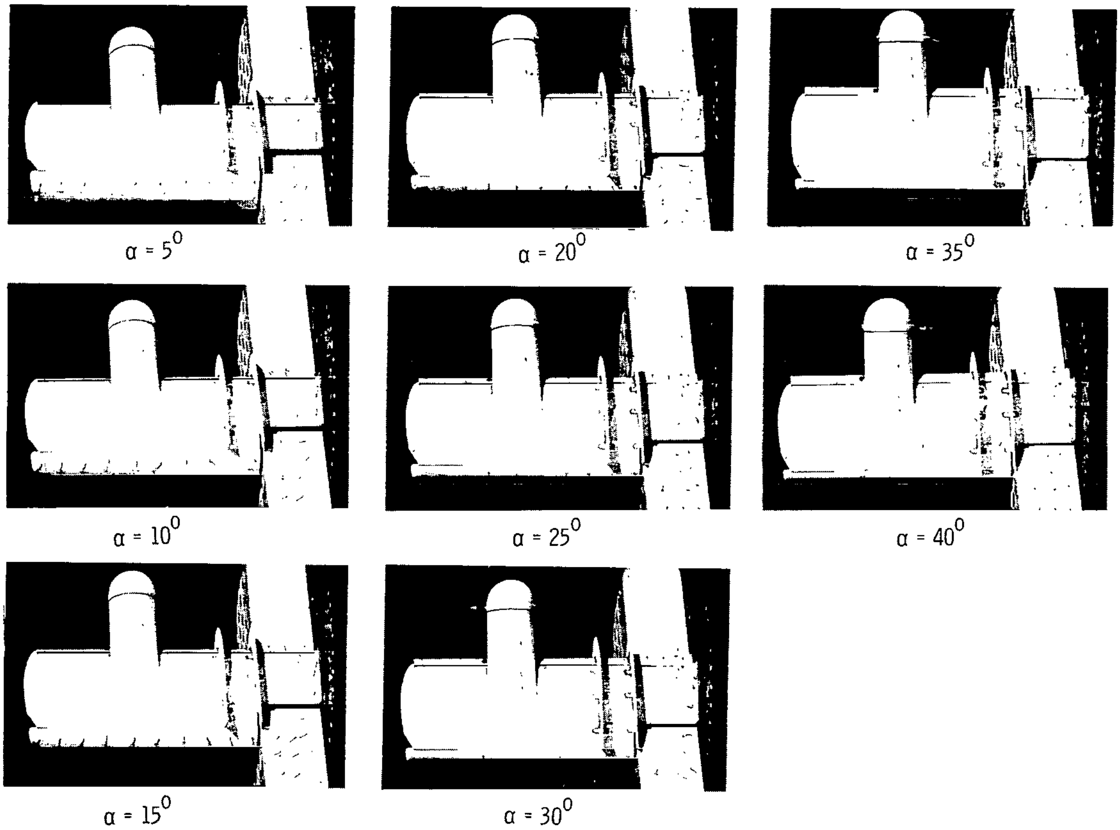
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 16.- Continued.



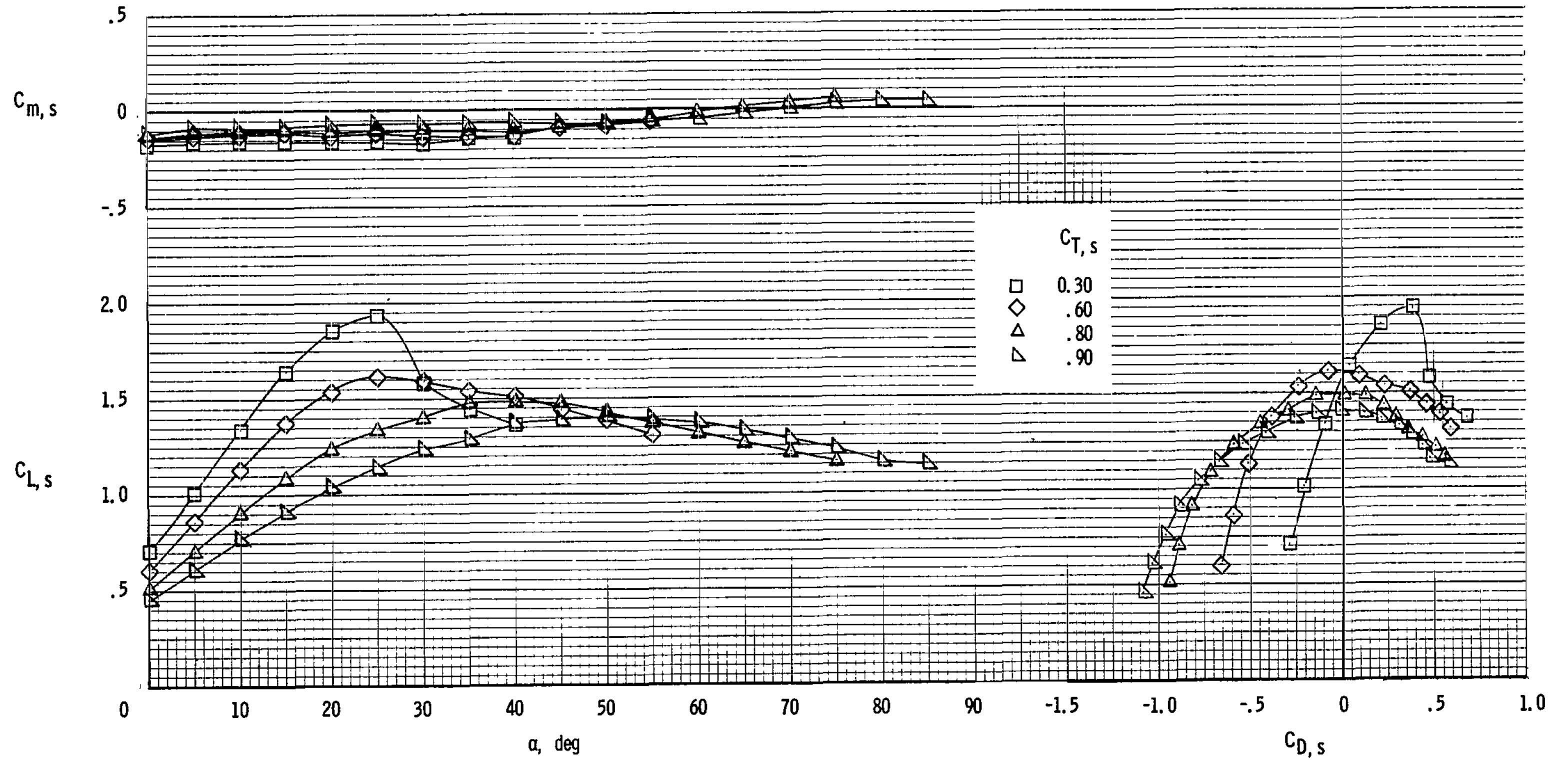
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 16.- Continued.



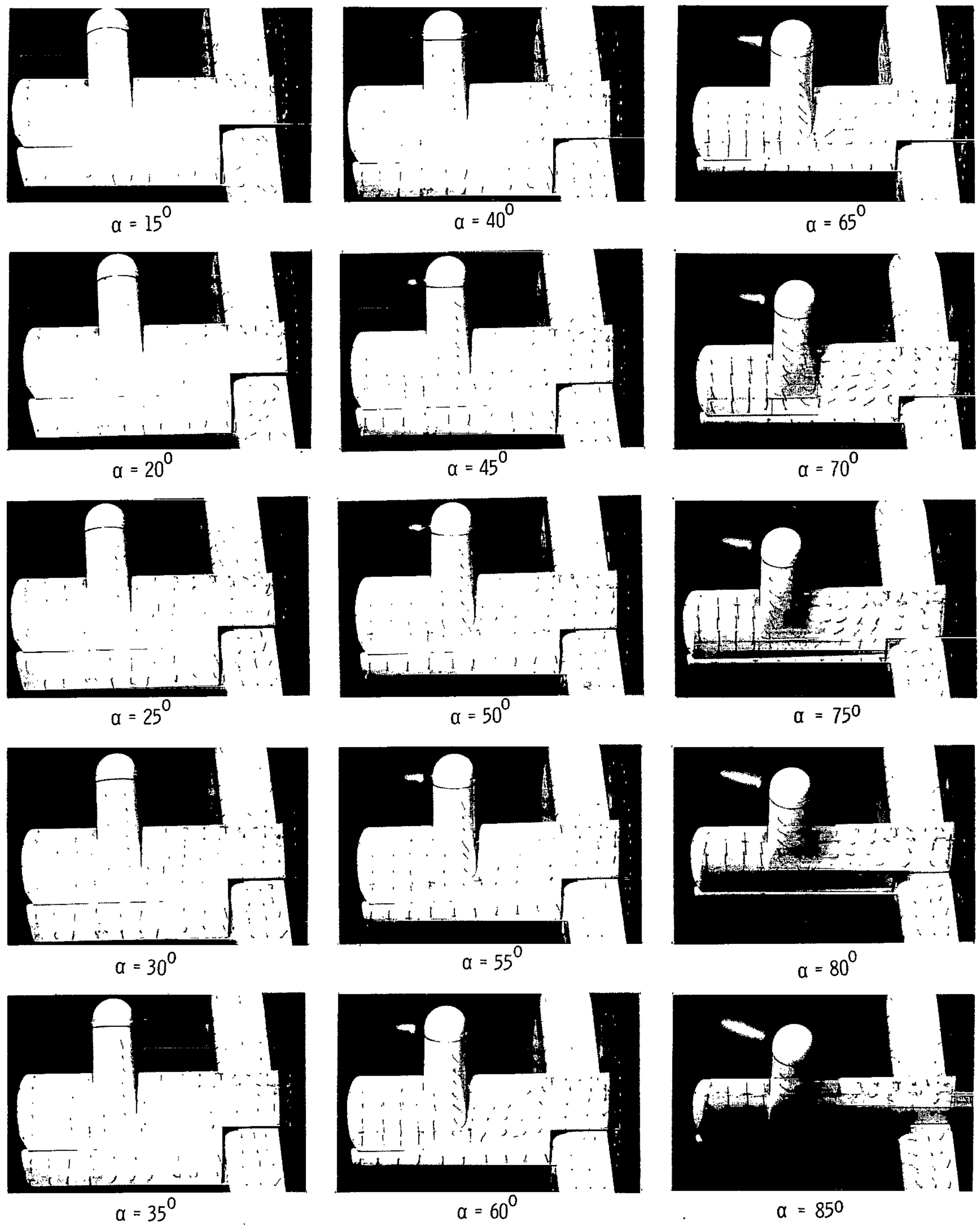
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 16.- Concluded.



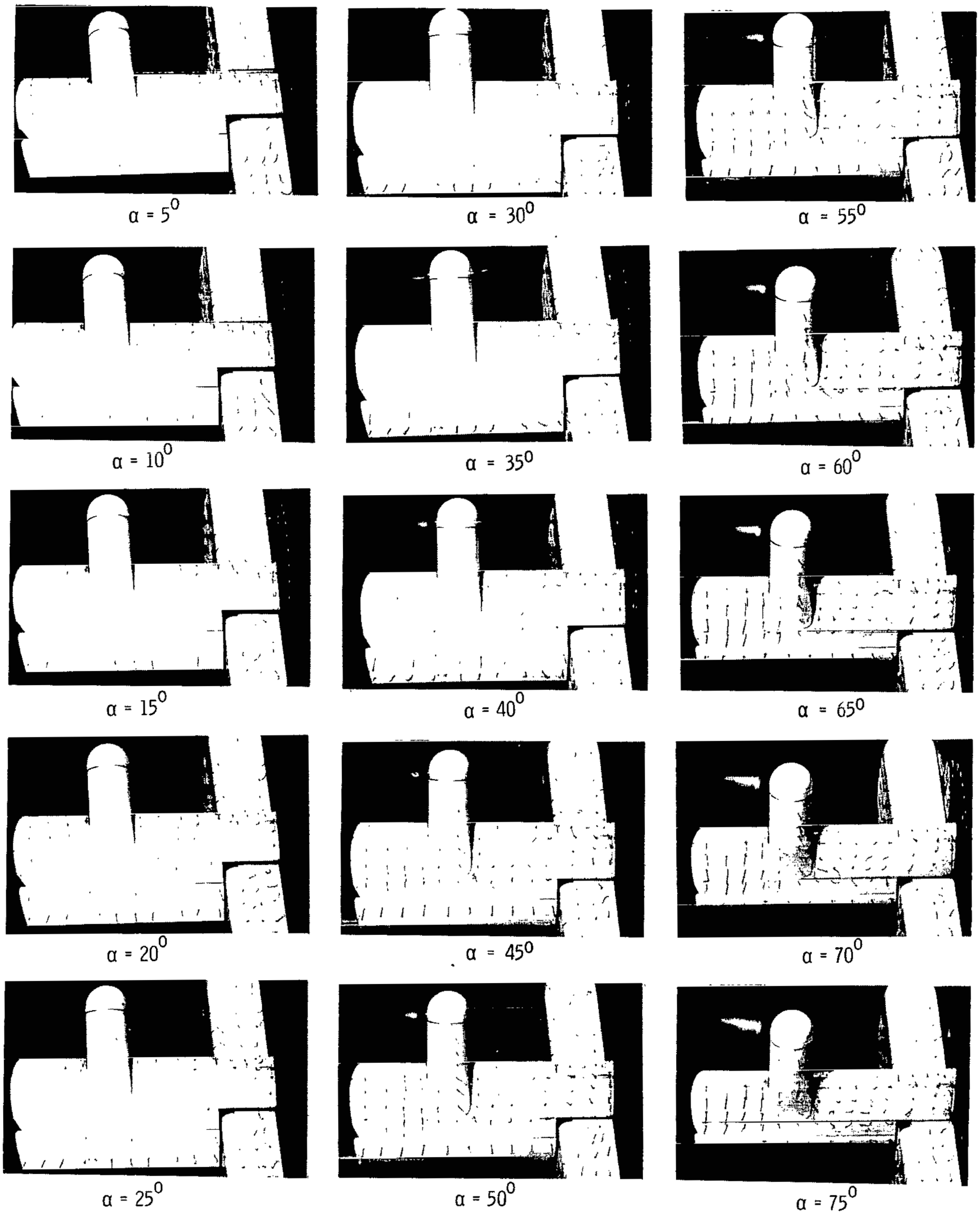
(a) Aerodynamic characteristics.

Figure 17.- Aerodynamic and flow characteristics of the wing with propeller rotation down at the tip. Basic leading edge; $\delta_f = 20^0$.



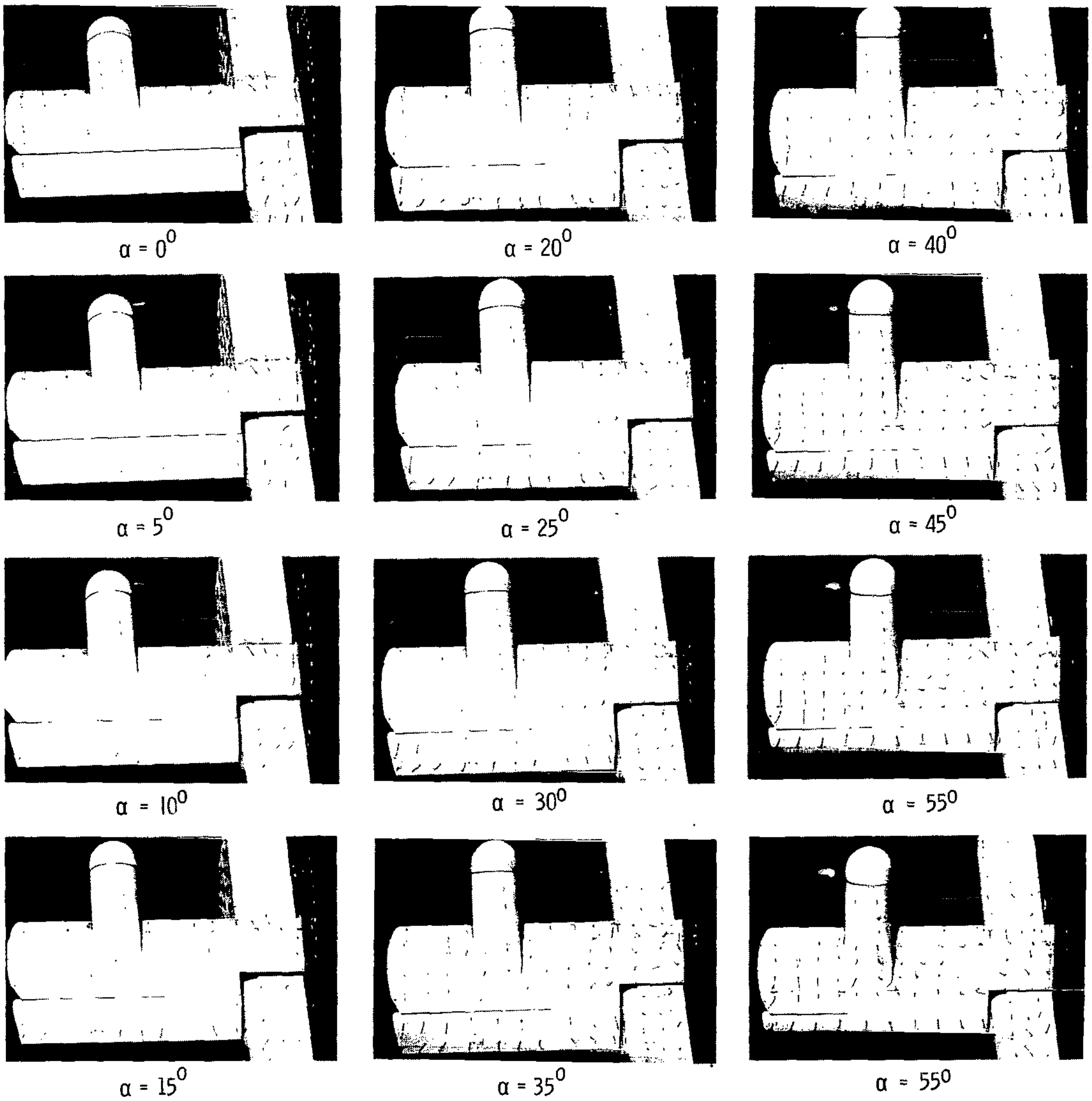
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 17.- Continued.



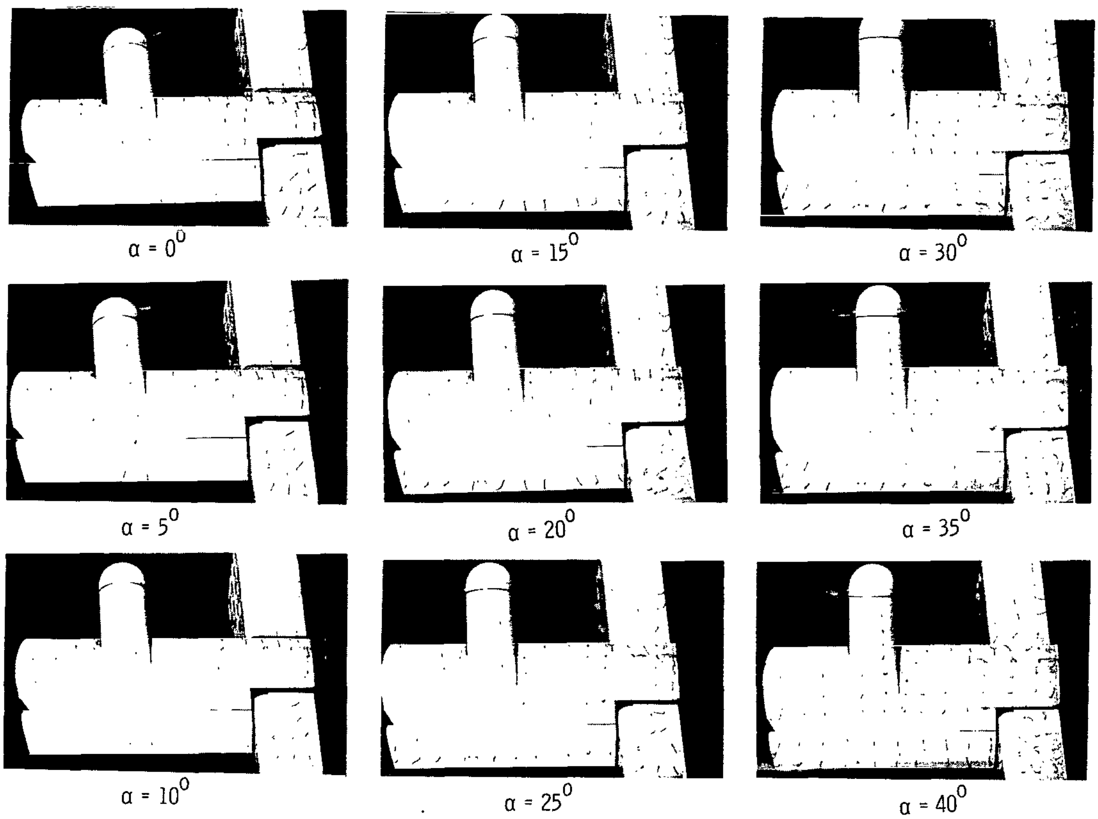
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 17.- Continued.



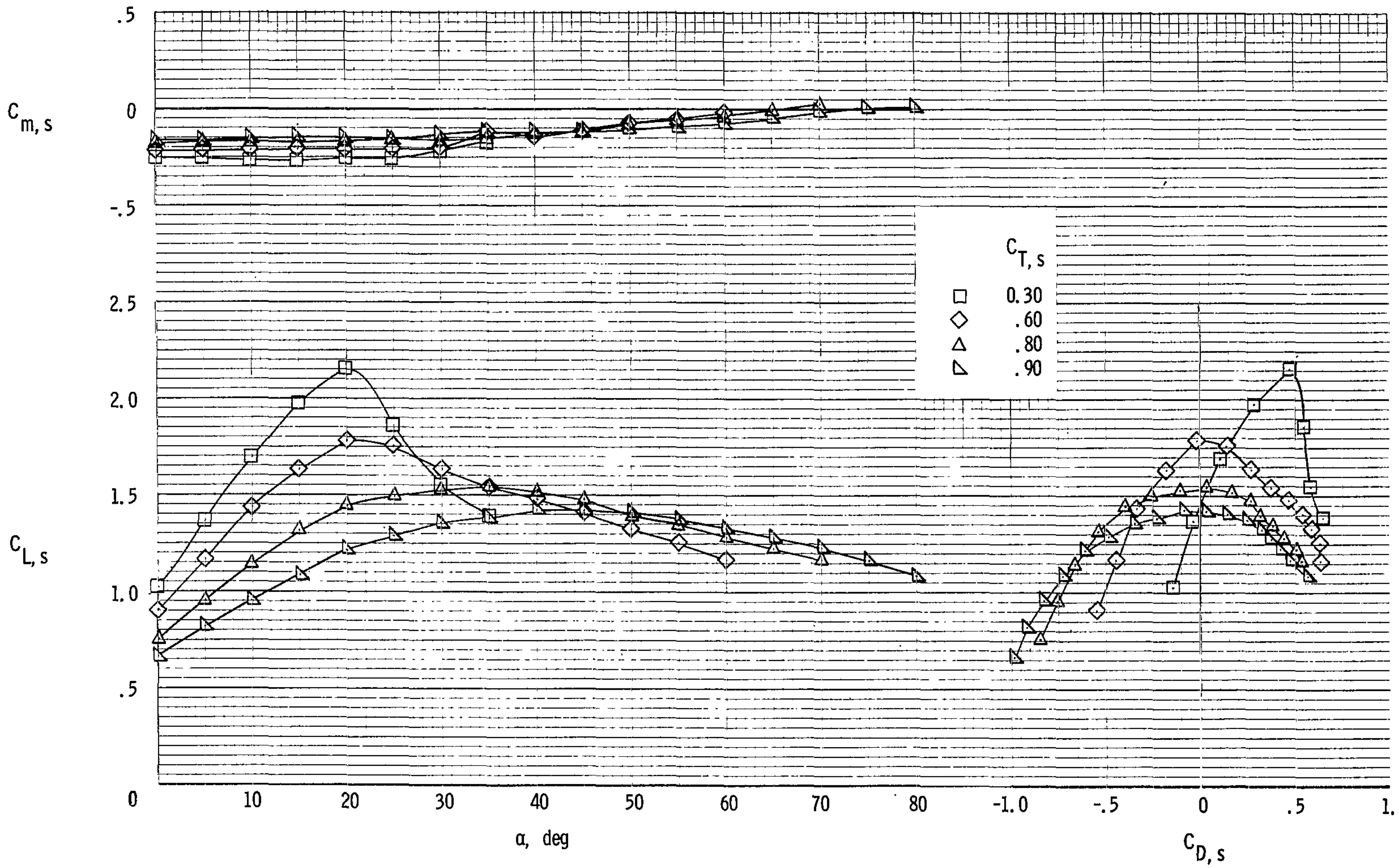
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 17.- Continued.



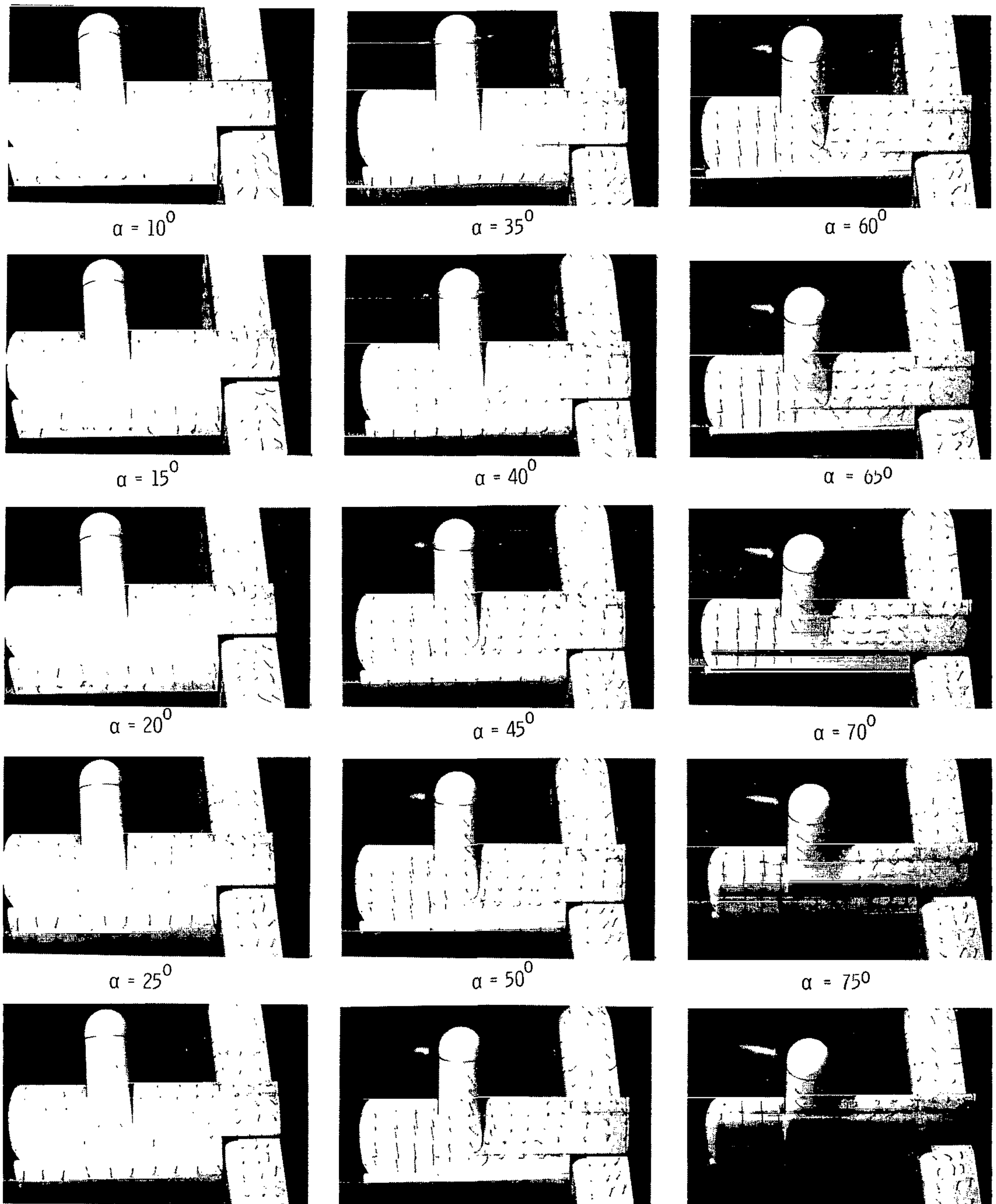
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 17.- Concluded.



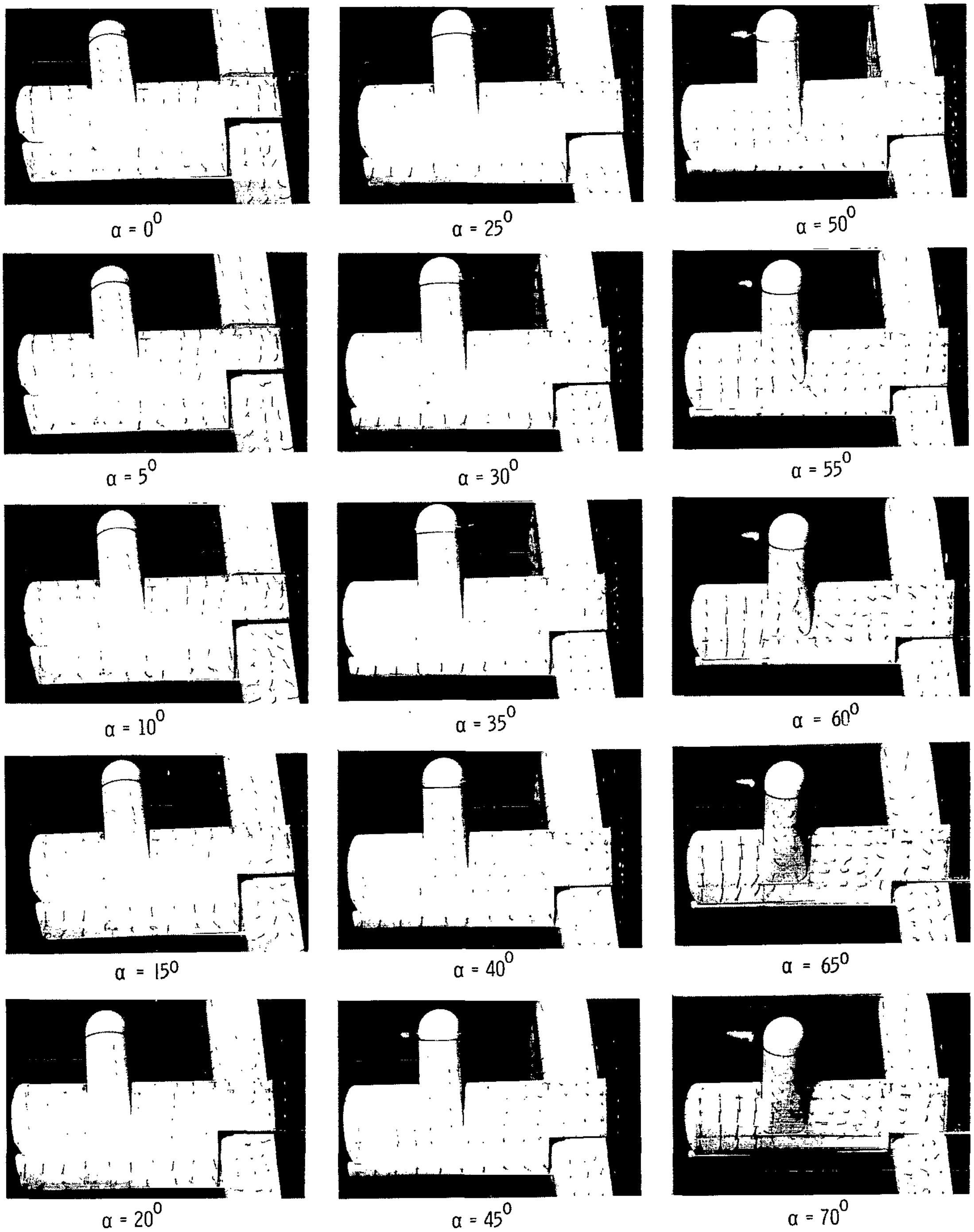
(a) Aerodynamic characteristics.

Figure 18.- Aerodynamic and flow characteristics of the wing with propeller rotation down at the tip. Basic leading edge; $\delta_f = 40^{\circ}$.



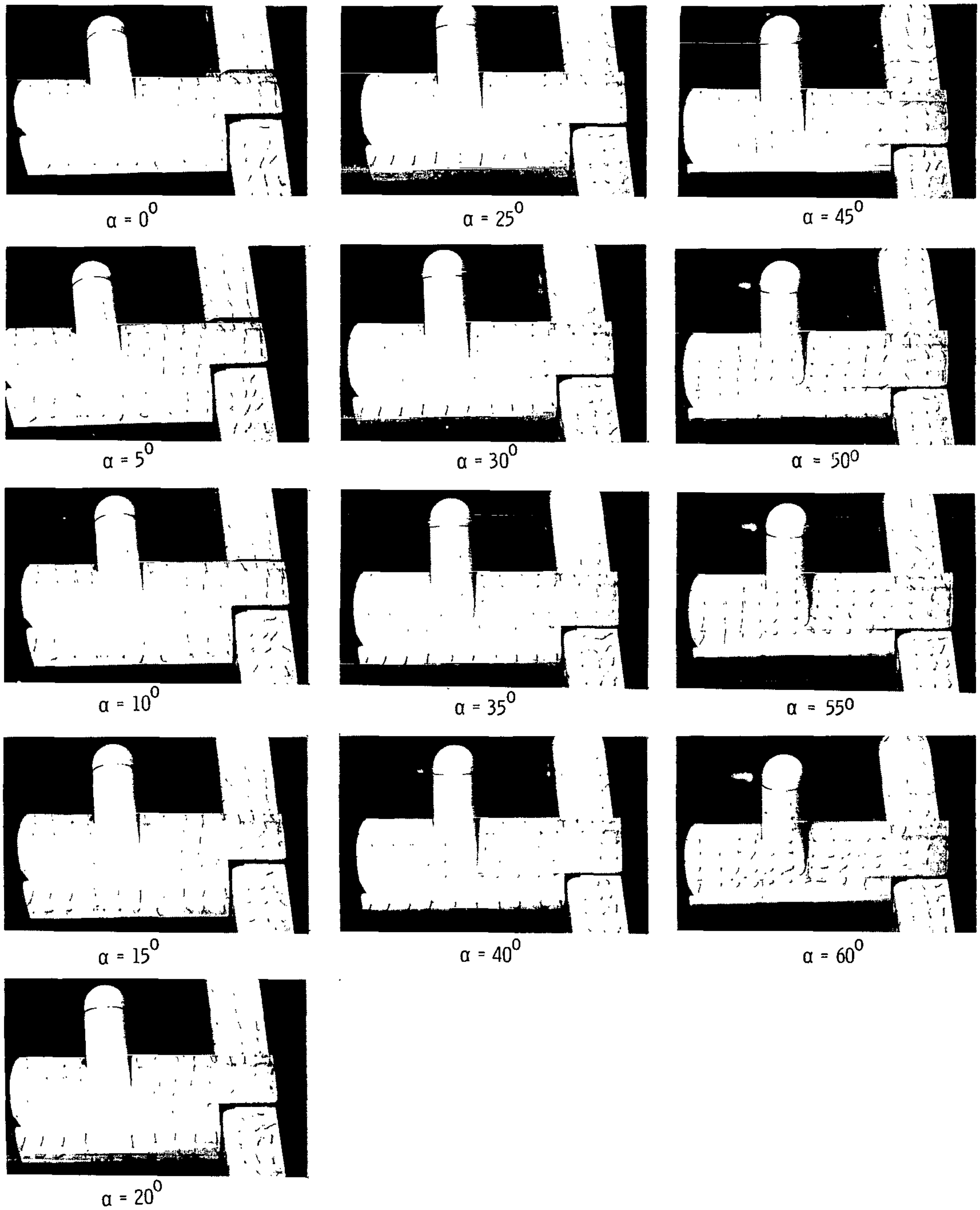
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 18.- Continued.



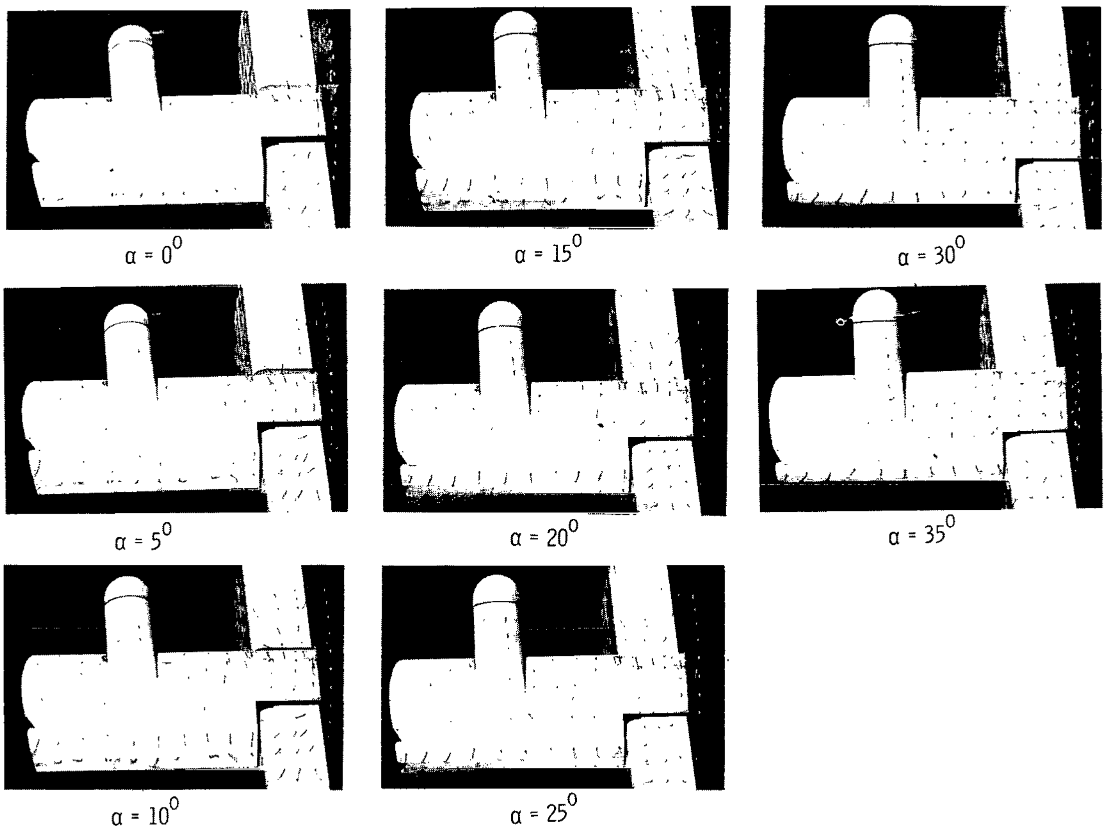
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 18.- Continued.



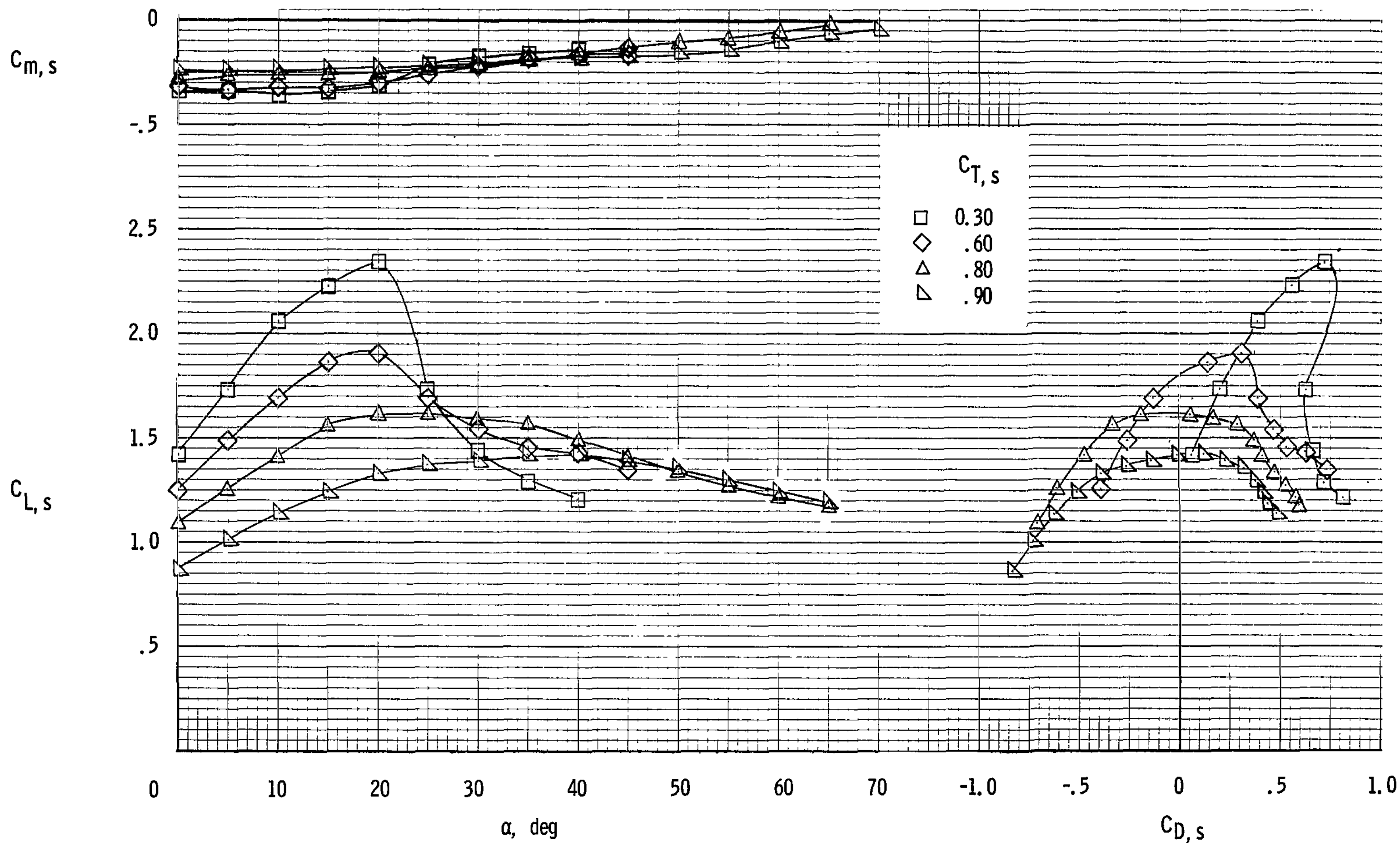
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 18.- Continued.



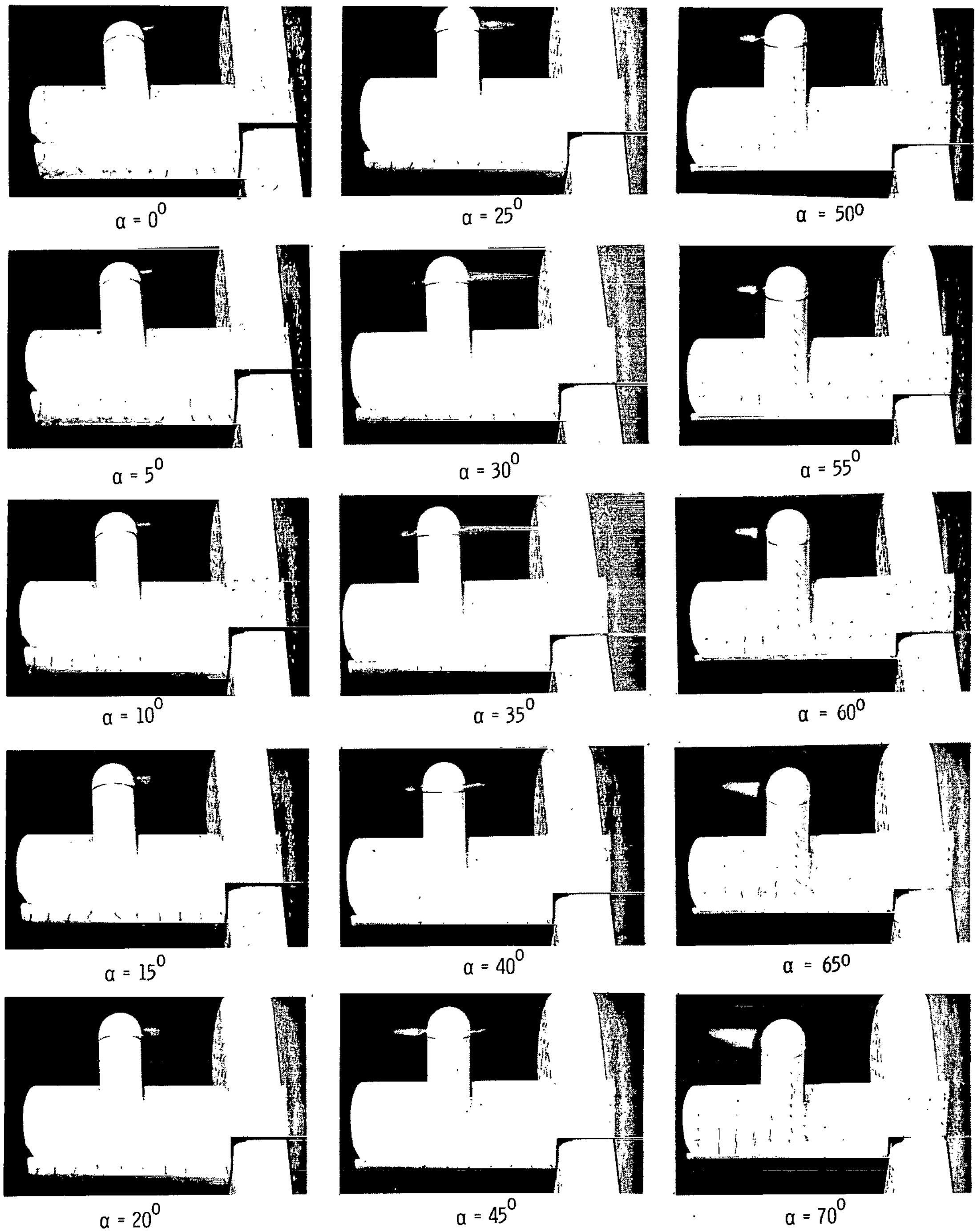
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 18.- Concluded.



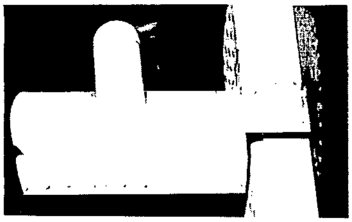
(a) Aerodynamic characteristics.

Figure 19.- Aerodynamic and flow characteristics of the wing with propeller rotation down at the tip. Basic leading edge; $\delta_f = 60^0$.



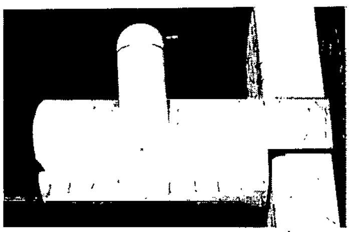
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 19.- Continued.

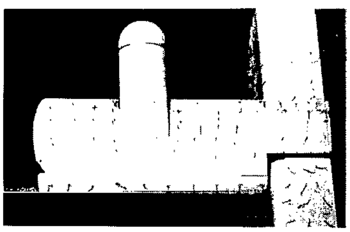


$\alpha = 0^{0}$

$\alpha = 50$



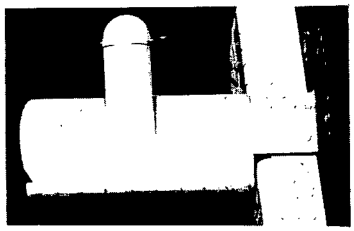
$\alpha = 10^{0}$



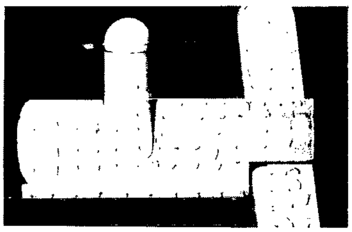
$\alpha = 15^{0}$

$\alpha = 20^{0}$

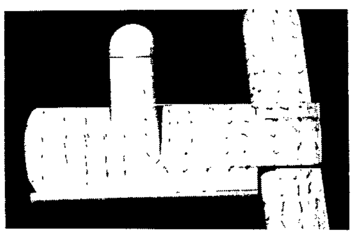
$\alpha = 25^{0}$



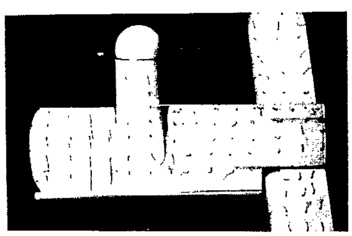
$\alpha = 30^{0}$



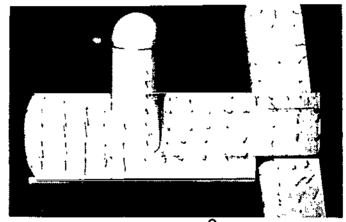
$\alpha = 35^{0}$



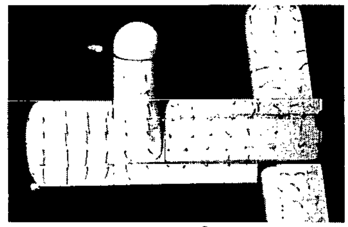
$\alpha = 40^{0}$



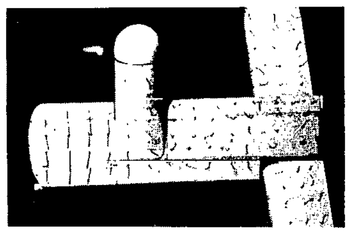
$\alpha = 45^{0}$



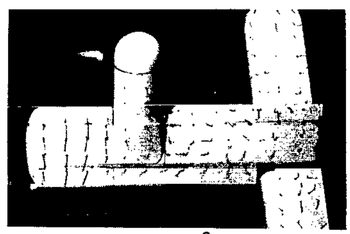
$\alpha = 50^{0}$



$\alpha = 55^{0}$



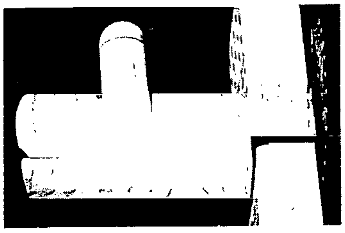
$\alpha = 60^{0}$



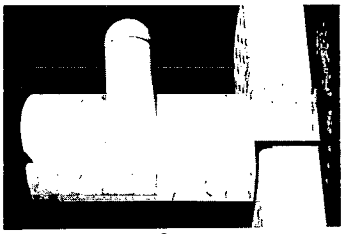
$\alpha = 65^{0}$

(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 19.- Continued.

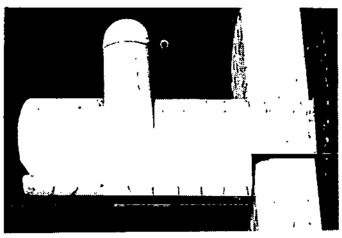


$\alpha = 0^0$

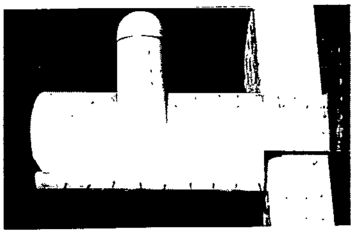


$\alpha = 5^0$

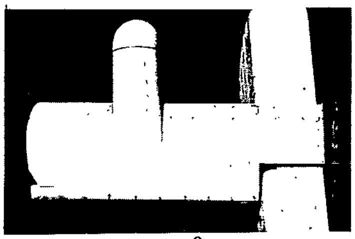
$\alpha = 10^0$



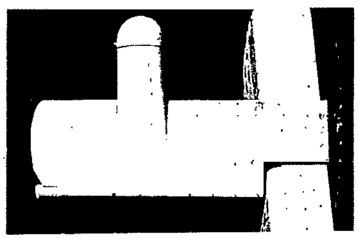
$\alpha = 15^0$



$\alpha = 20^0$



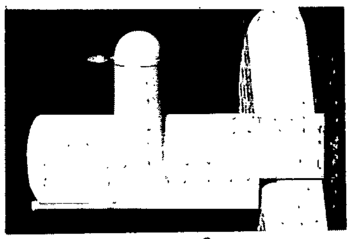
$\alpha = 25^0$



$\alpha = 30^0$

$\alpha = 35^0$

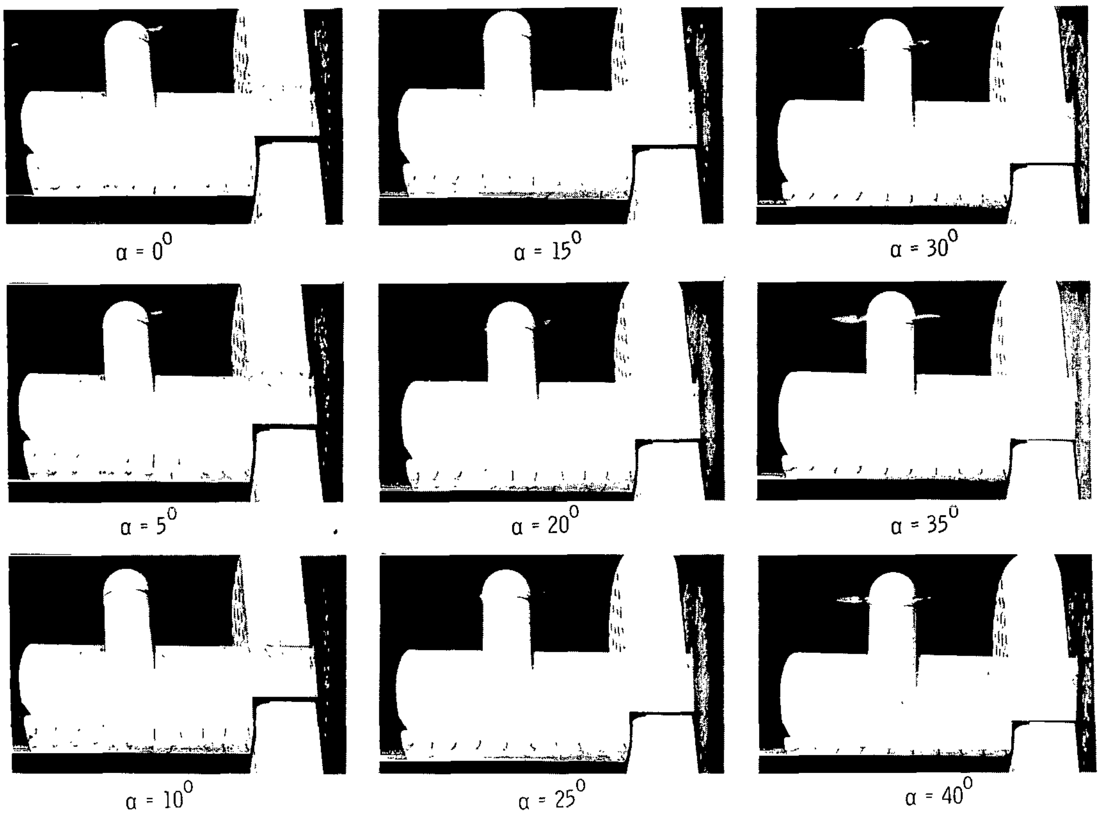
$\alpha = 40^0$



$\alpha = 45^0$

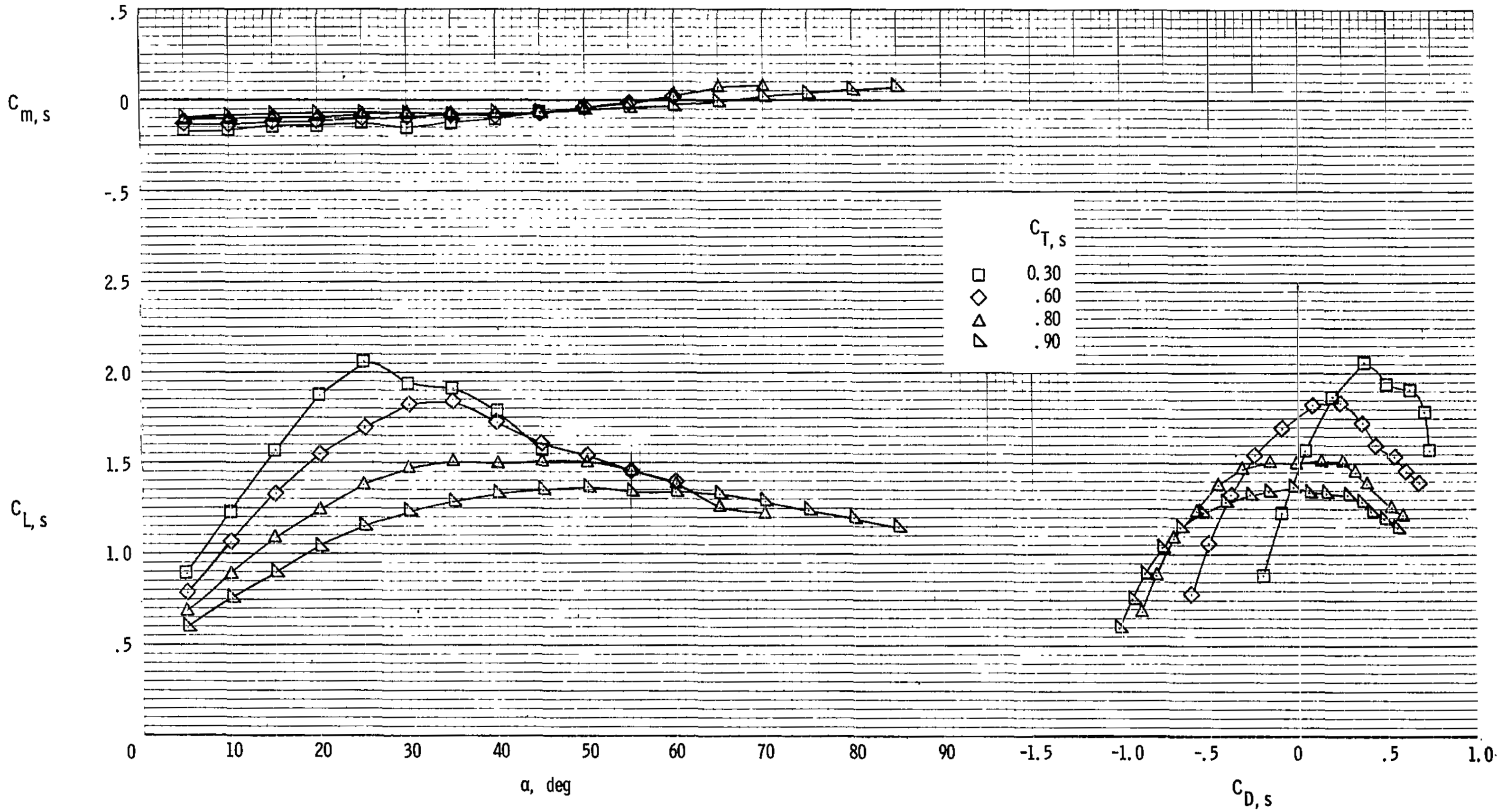
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 19.- Continued.



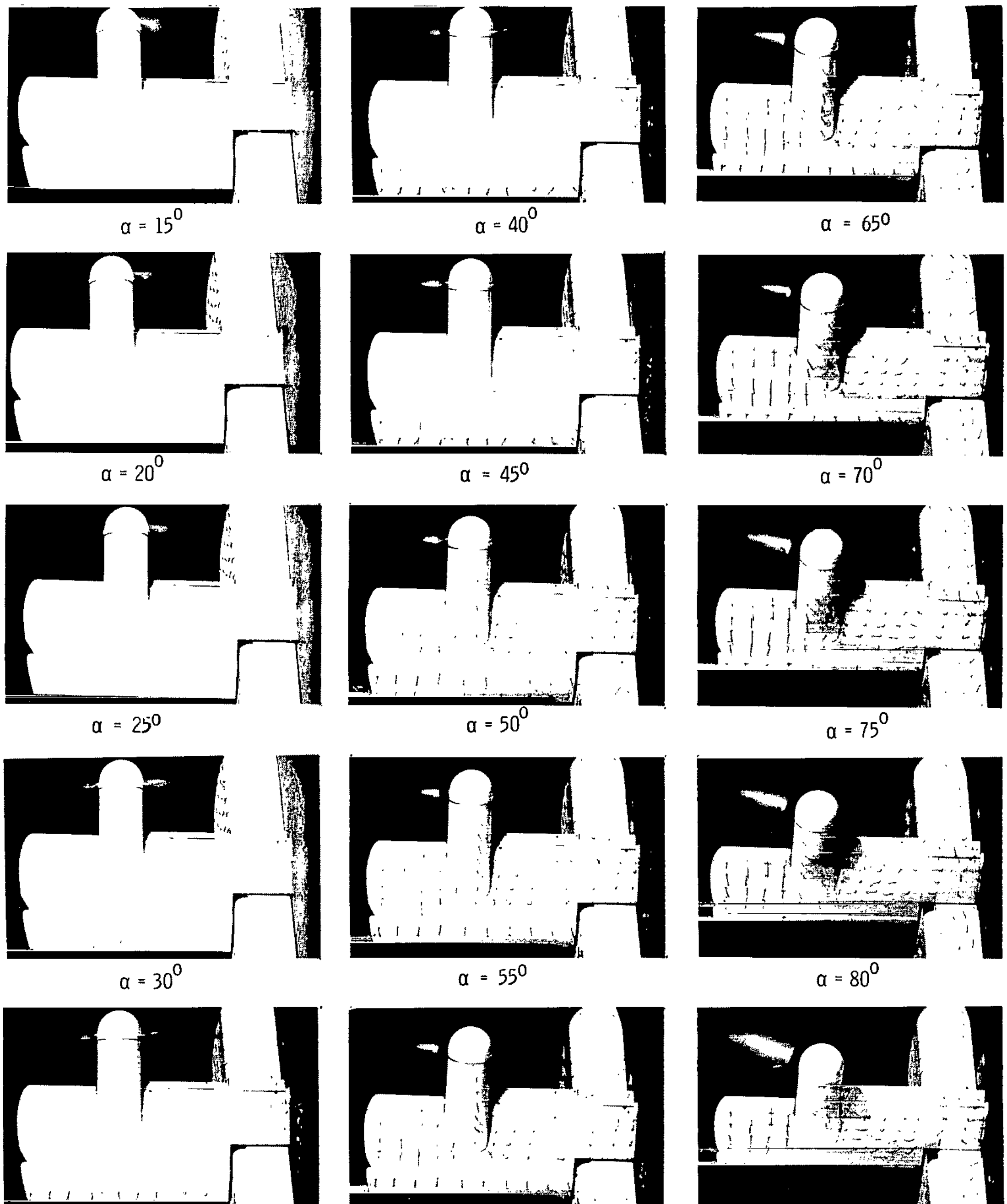
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 19.- Concluded.



(a) Aerodynamic characteristics.

Figure 20.- Aerodynamic and flow characteristics of the wing with propeller rotation down at the tip. Inboard slat on; $\delta_f = 20^o$.



$\alpha = 15^0$ $\alpha = 40^0$ $\alpha = 65^0$

$\alpha = 20^0$ $\alpha = 45^0$ $\alpha = 70^0$

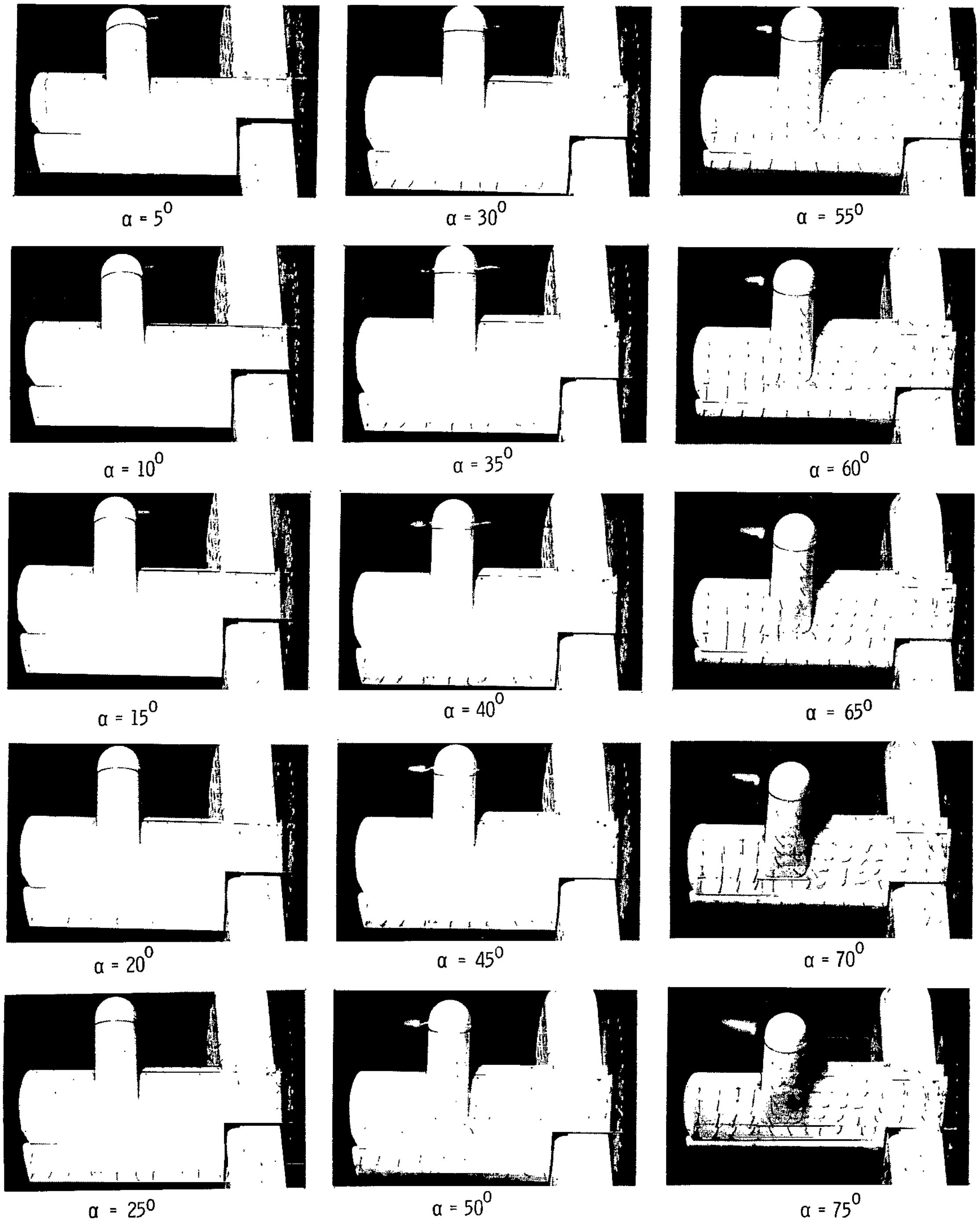
$\alpha = 25^0$ $\alpha = 50^0$ $\alpha = 75^0$

$\alpha = 30^0$ $\alpha = 55^0$ $\alpha = 80^0$

$\alpha = 35^0$ $\alpha = 60^0$ $\alpha = 85^0$

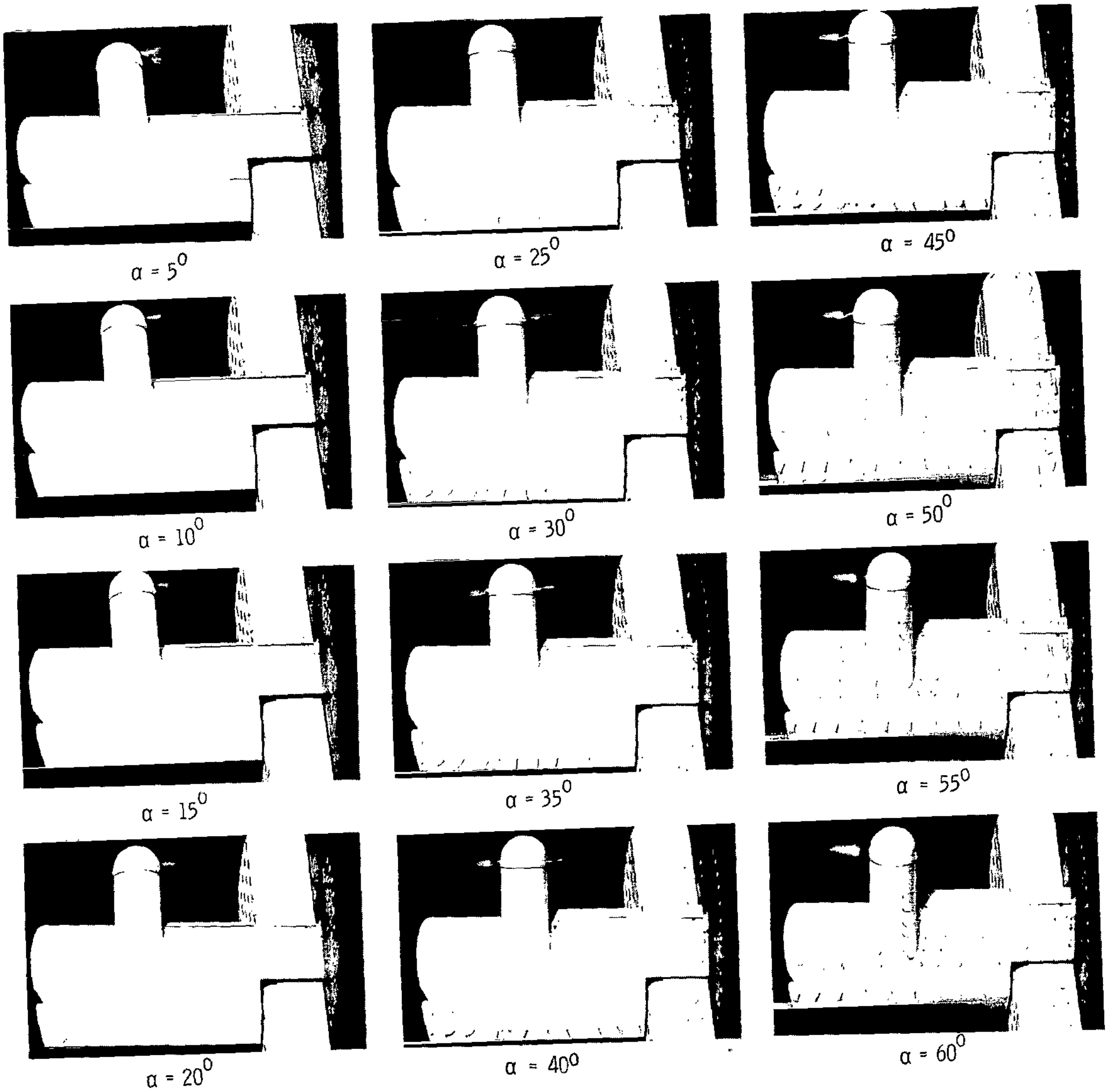
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 20.- Continued.



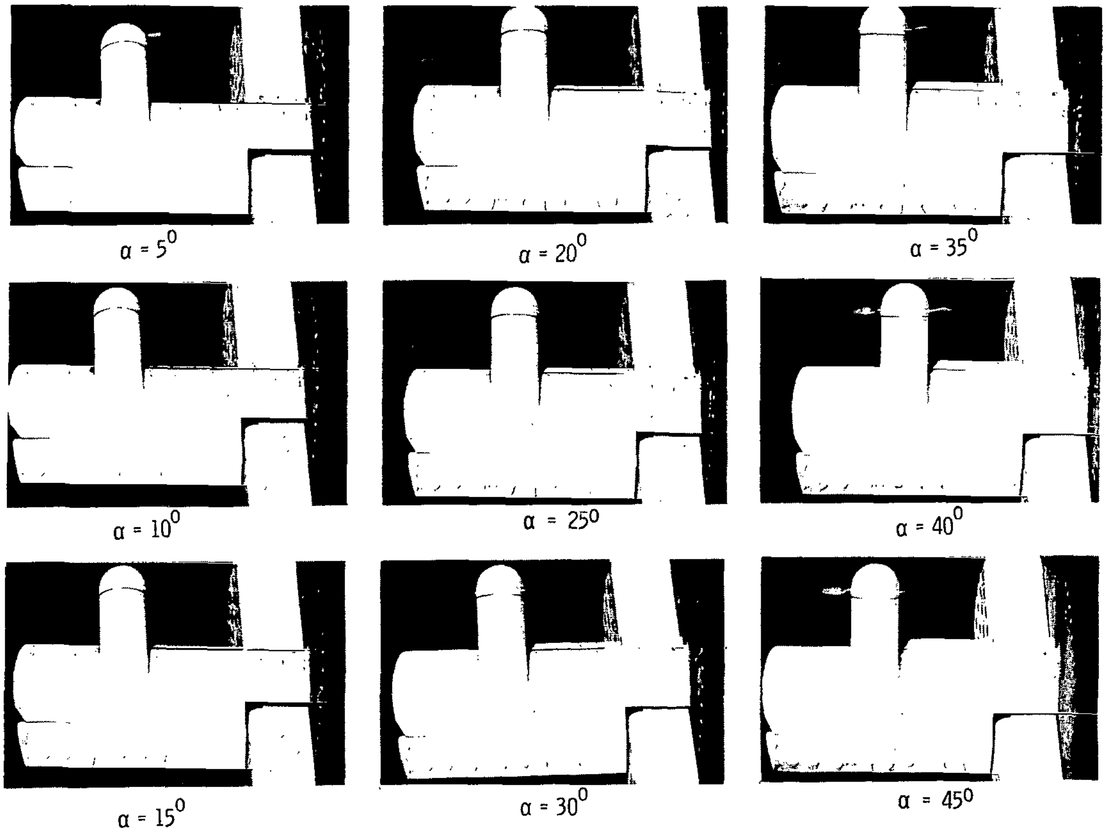
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 20.- Continued.



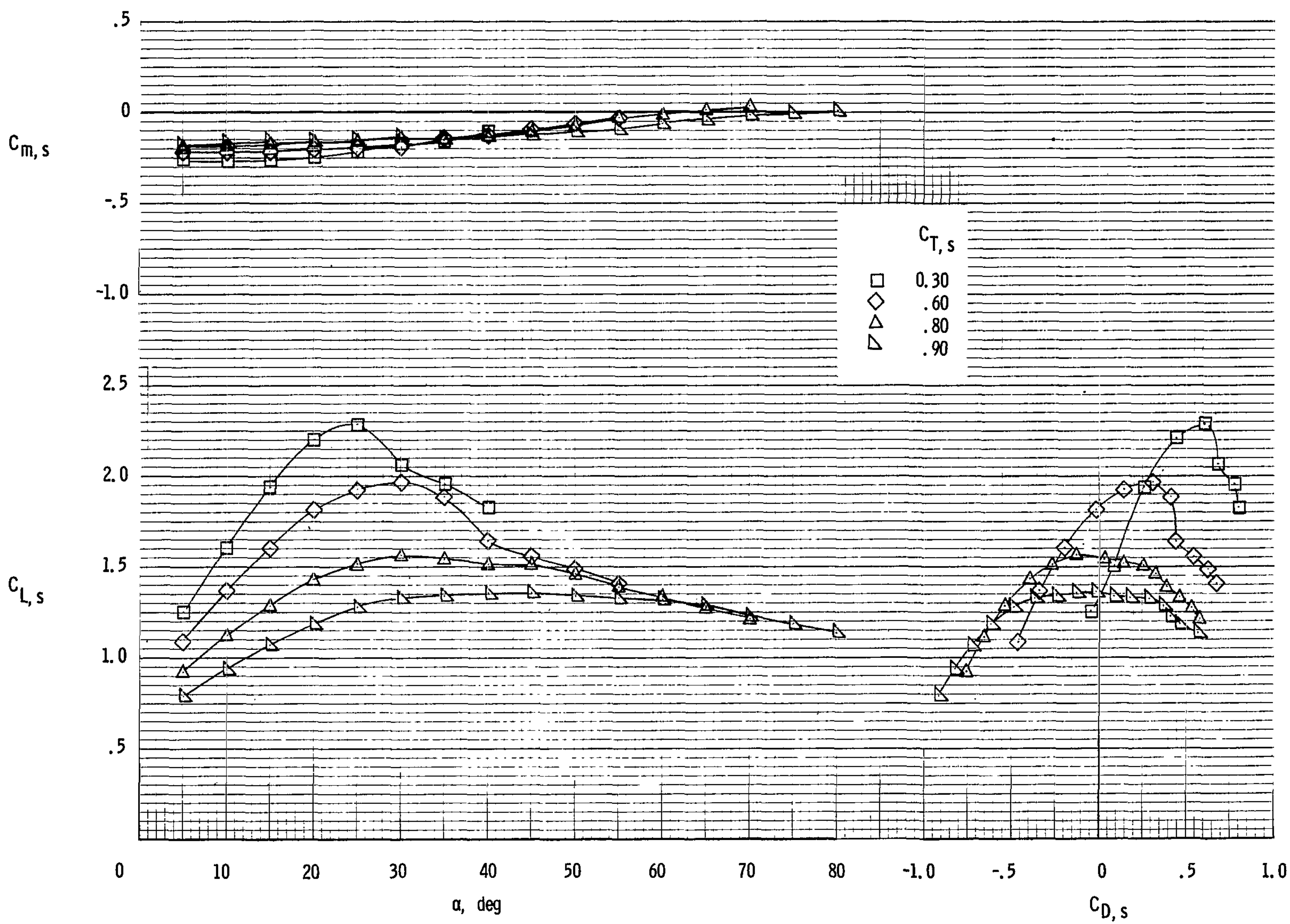
(d) Flow characteristics; $C_{T,s} \approx 0.60$.

Figure 20.- Continued.



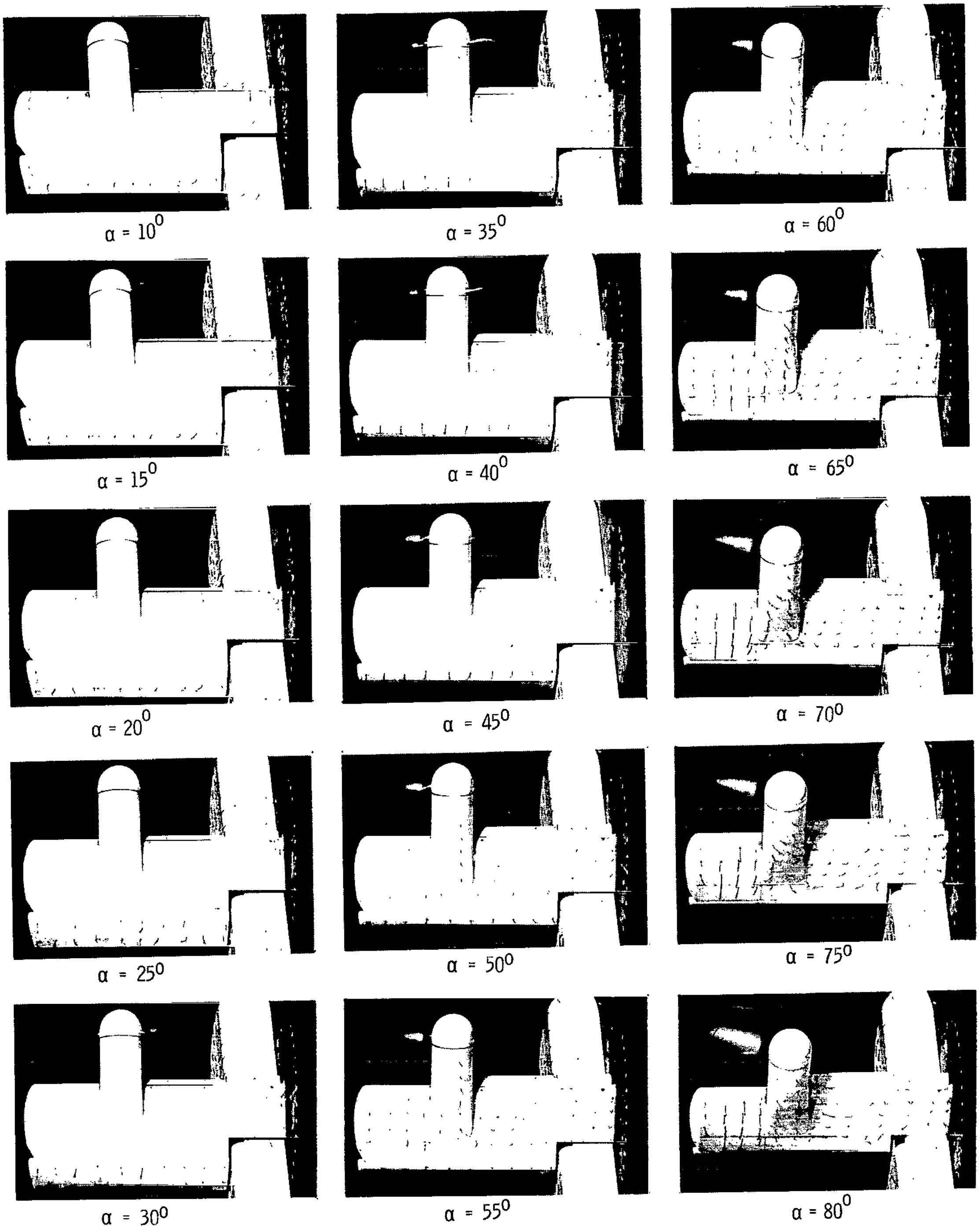
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 20.- Concluded.



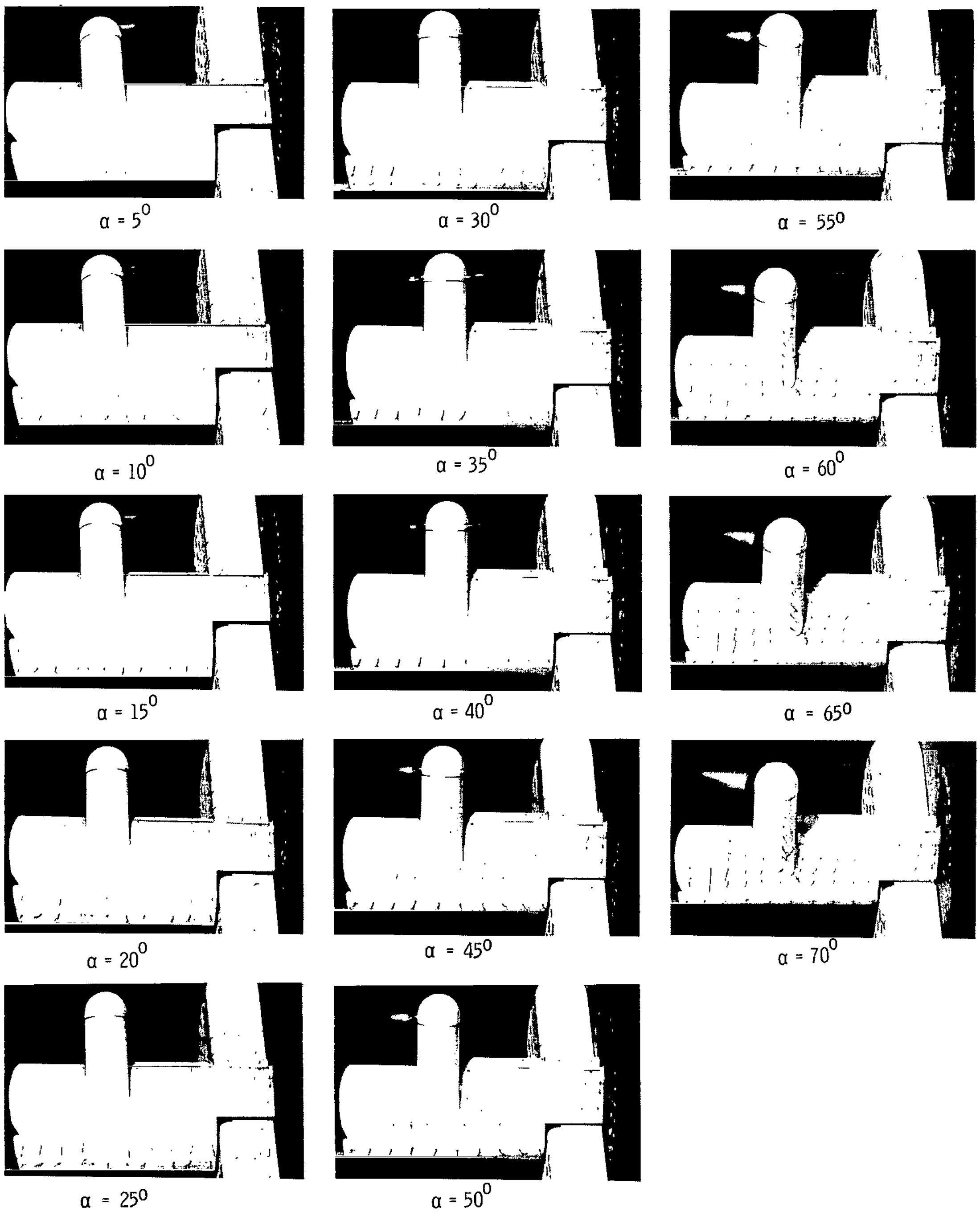
(a) Aerodynamic characteristics.

Figure 21.- Aerodynamic and flow characteristics of the wing with propeller rotation down at the tip. Inboard slat on; $\delta_f = 40^0$.



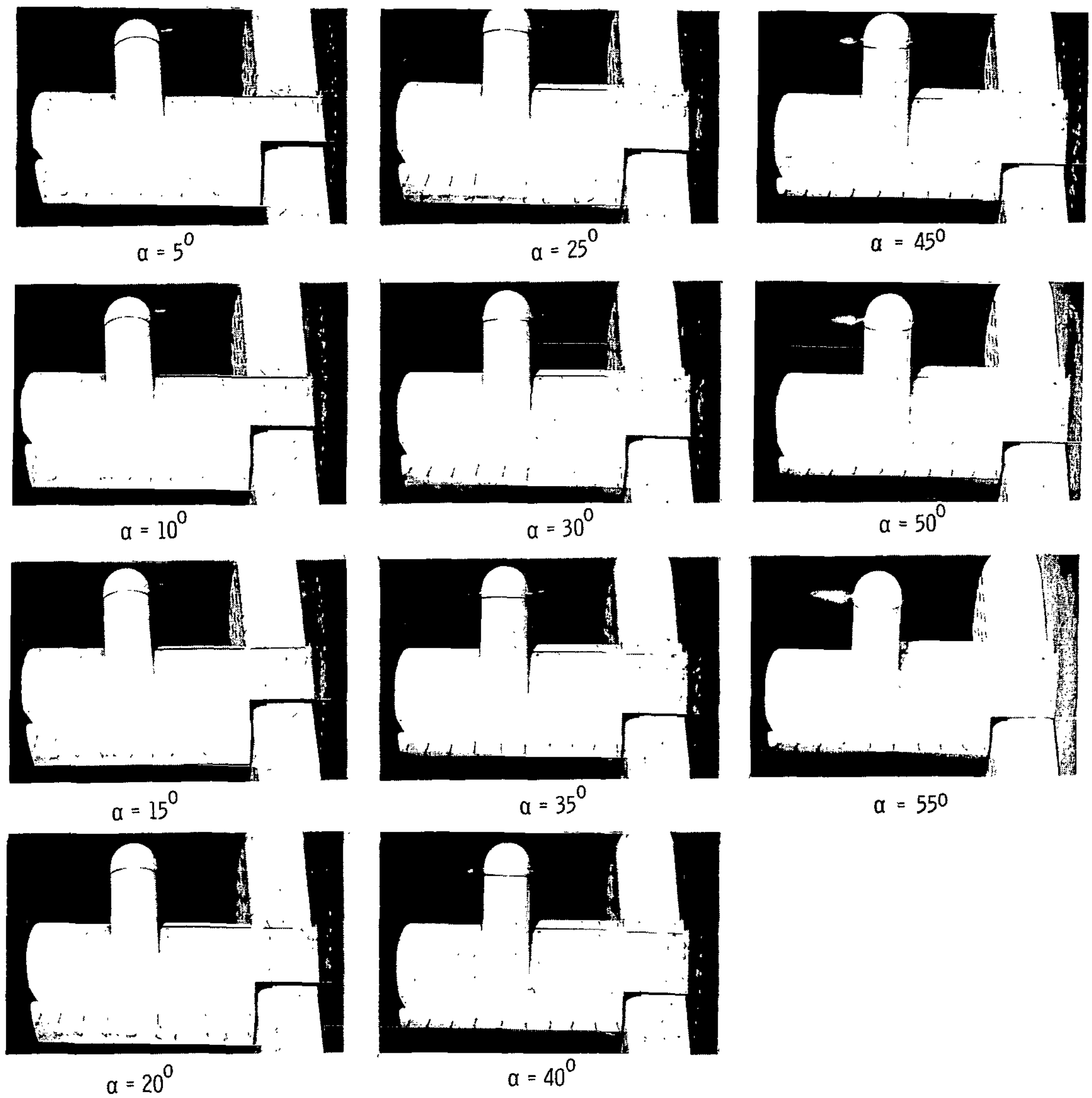
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 21.- Continued.



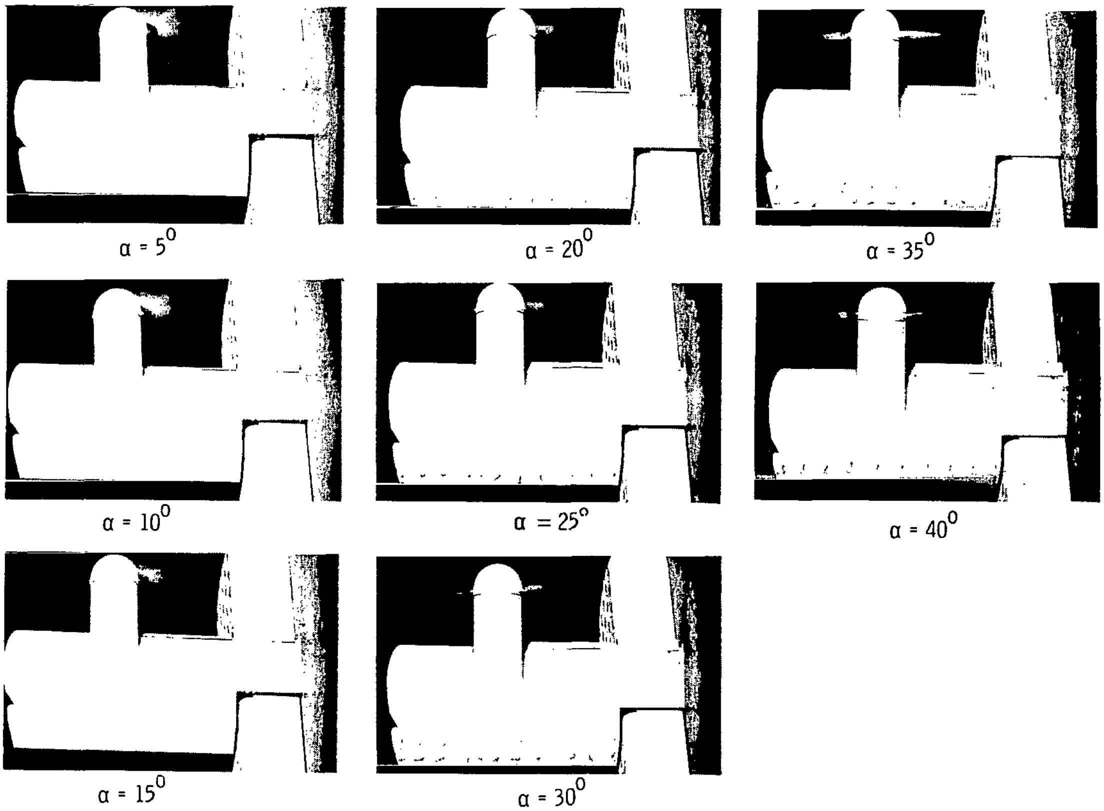
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 21.- Continued.



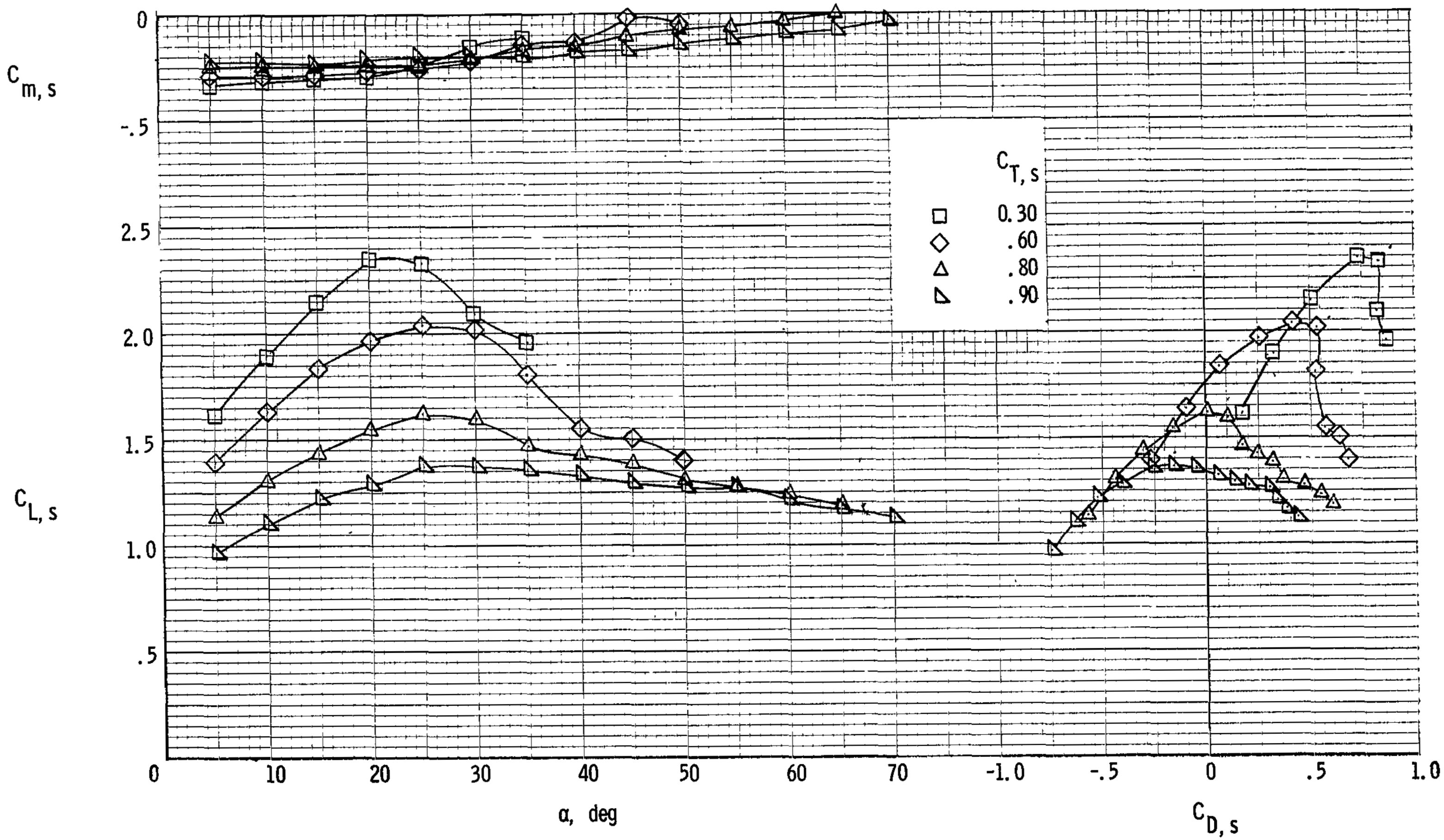
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 21.- Continued.



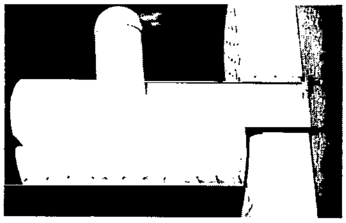
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 21.- Concluded.

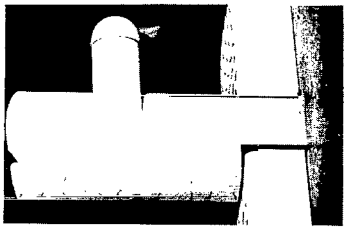


(a) Aerodynamic characteristics.

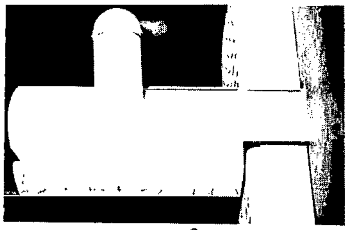
Figure 22.- Aerodynamic and flow characteristics of the wing with propeller rotation down at the tip. Inboard slat on; $\delta_f = 60^{\circ}$.



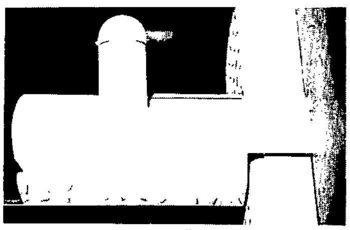
$\alpha = 5^0$



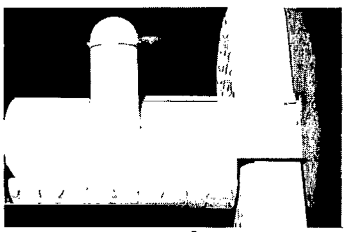
$\alpha = 10^0$



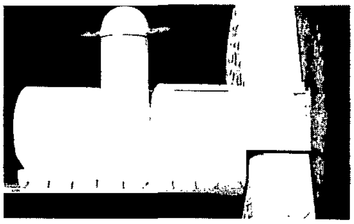
$\alpha = 15^0$



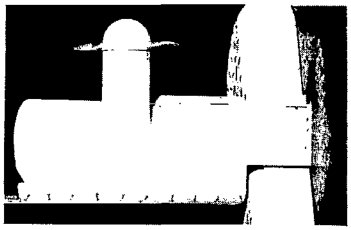
$\alpha = 20^0$



$\alpha = 25^0$

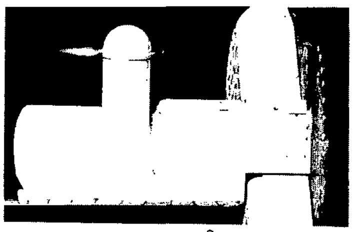


$\alpha = 30^0$

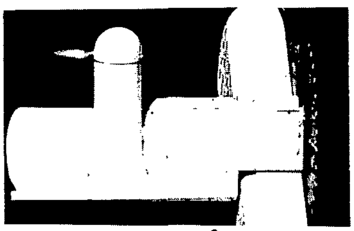


$\alpha = 35^0$

$\alpha = 40^0$

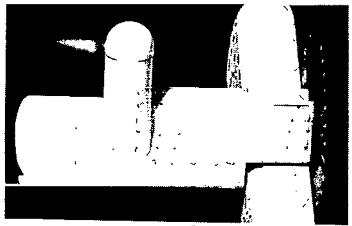


$\alpha = 45^0$

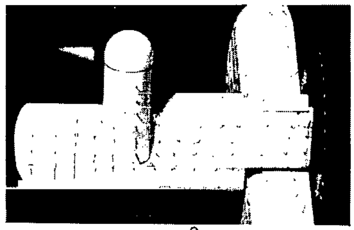


$\alpha = 50^0$

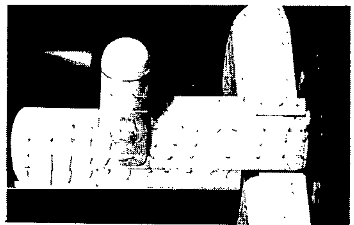
$\alpha = 55^0$



$\alpha = 60^0$



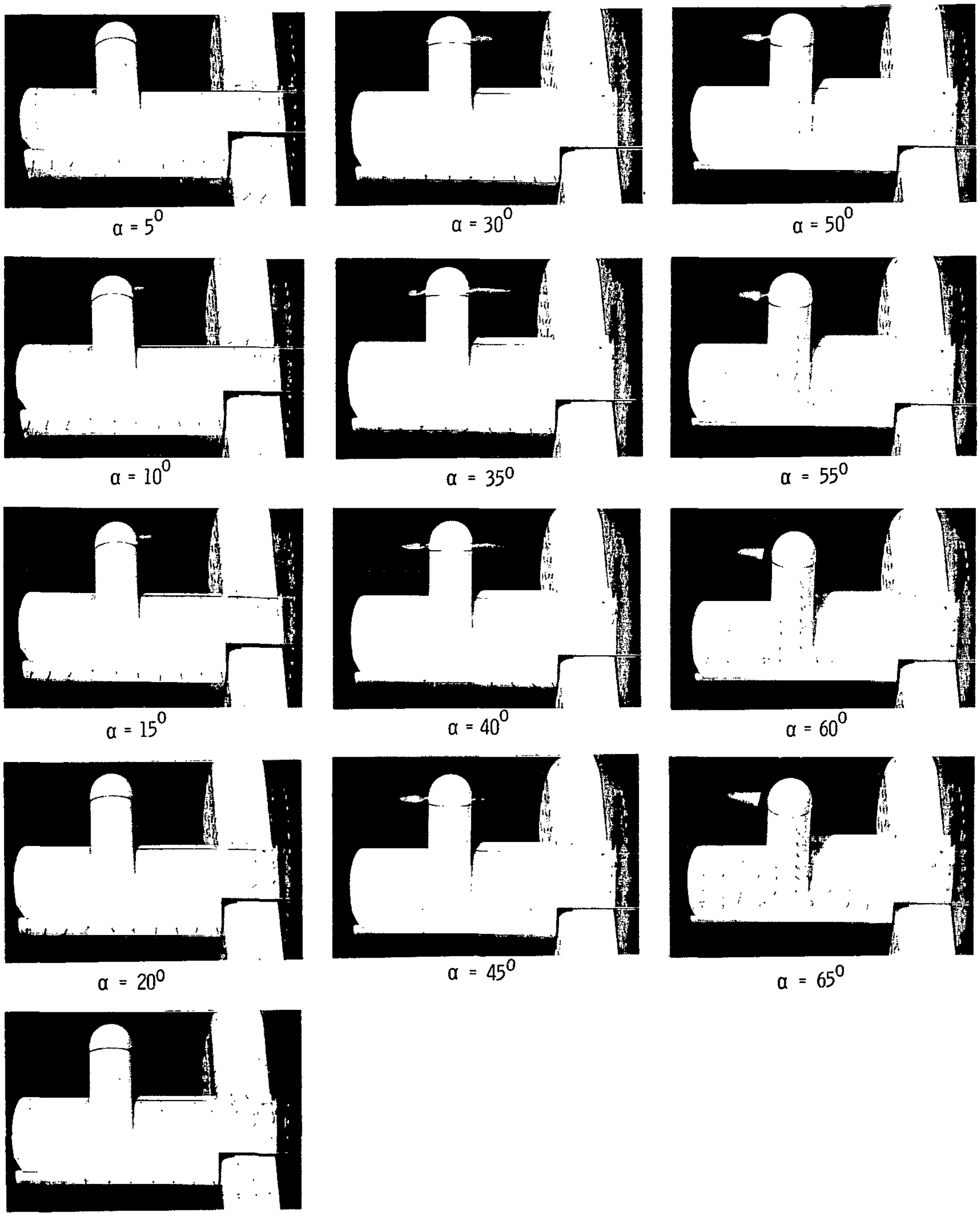
$\alpha = 65^0$



$\alpha = 70^0$

(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 22.- Continued.



$\alpha = 5^0$ $\alpha = 30^0$ $\alpha = 50^0$

$\alpha = 10^0$ $\alpha = 35^0$ $\alpha = 55^0$

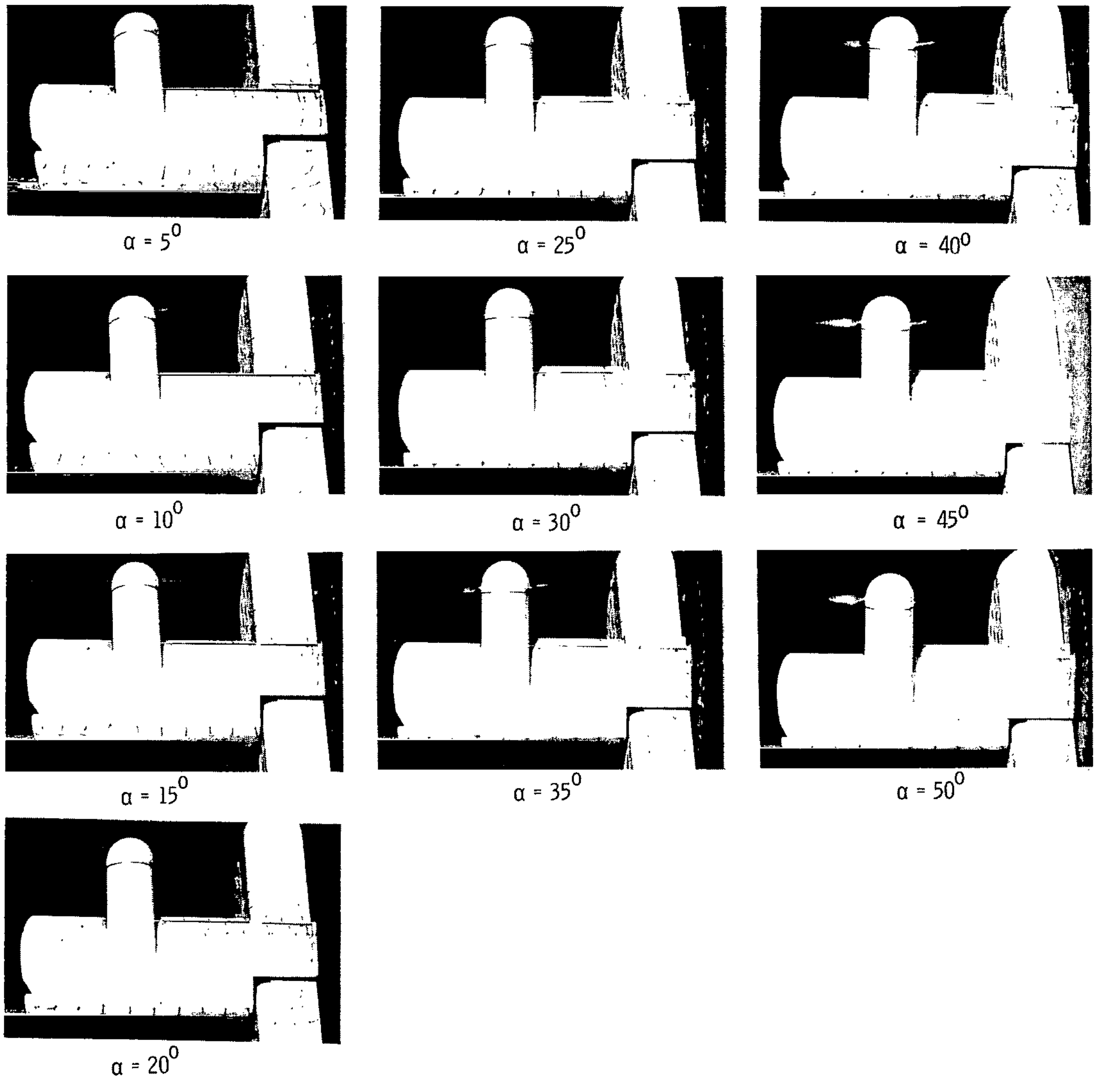
$\alpha = 15^0$ $\alpha = 40^0$ $\alpha = 60^0$

$\alpha = 20^0$ $\alpha = 45^0$ $\alpha = 65^0$

$\alpha = 25^0$

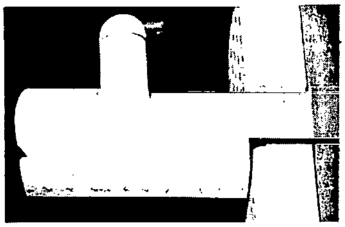
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 22.- Continued.

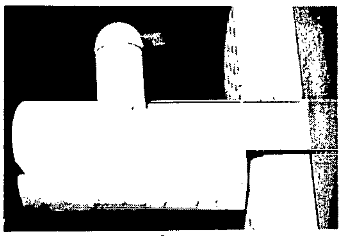


(d) Flow characteristics; $C_{T,s} = 0.60$.

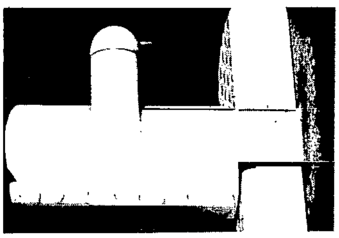
Figure 22.- Continued.



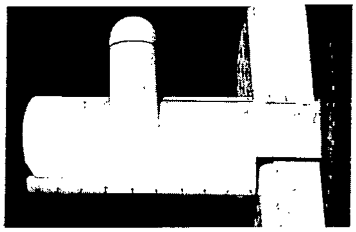
$\alpha = 5^0$



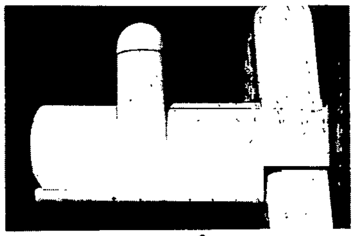
$\alpha = 10^0$



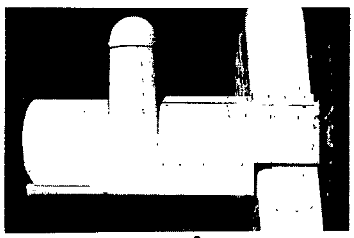
$\alpha = 15^0$



$\alpha = 20^0$



$\alpha = 25^0$

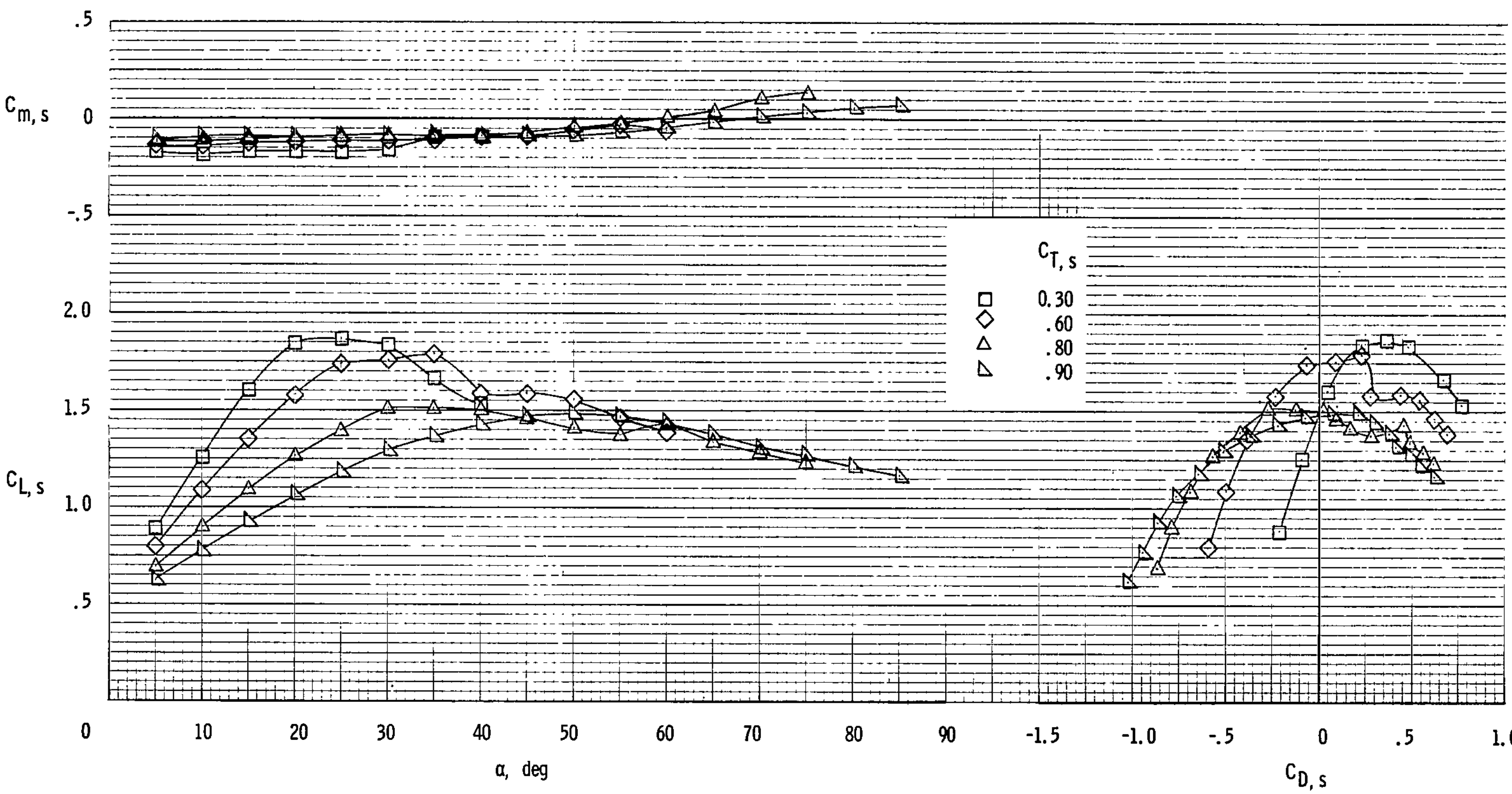


$\alpha = 30^0$

$\alpha = 35^0$

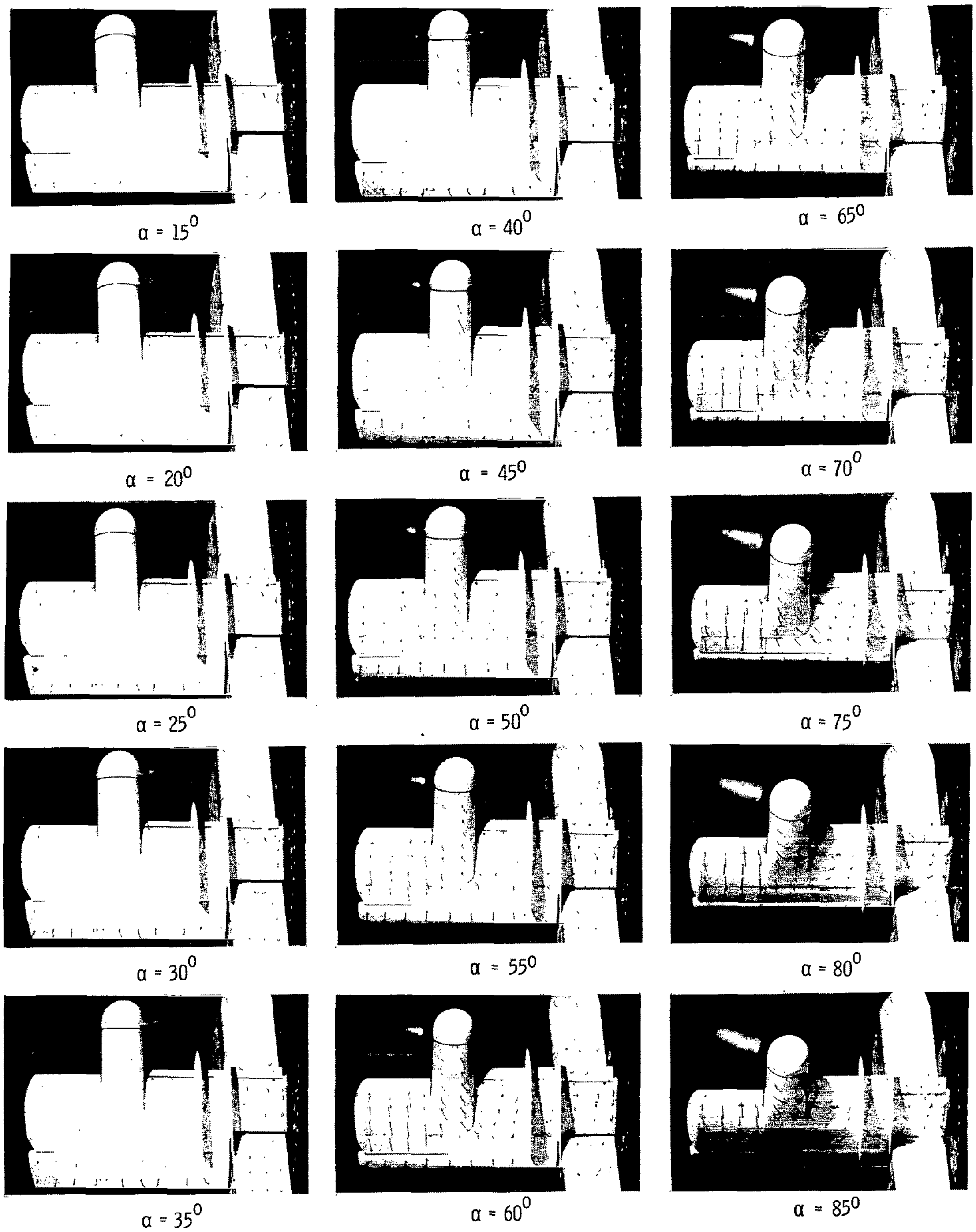
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 22.- Concluded.



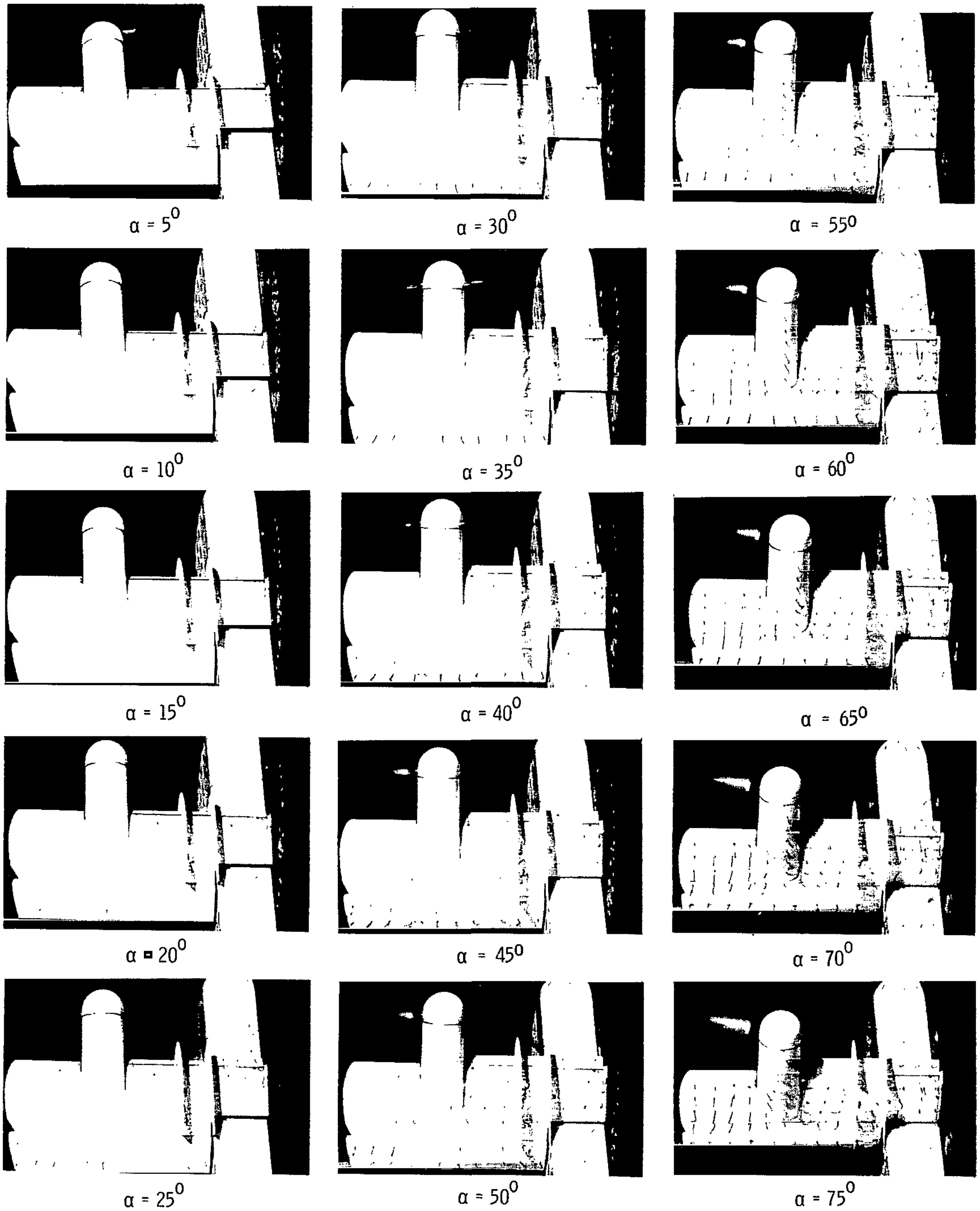
(a) Aerodynamic characteristics.

Figure 23.- Aerodynamic and flow characteristics of the wing with propeller rotation down at the tip. Inboard slat on; fences on; $\delta_f = 20^0$.



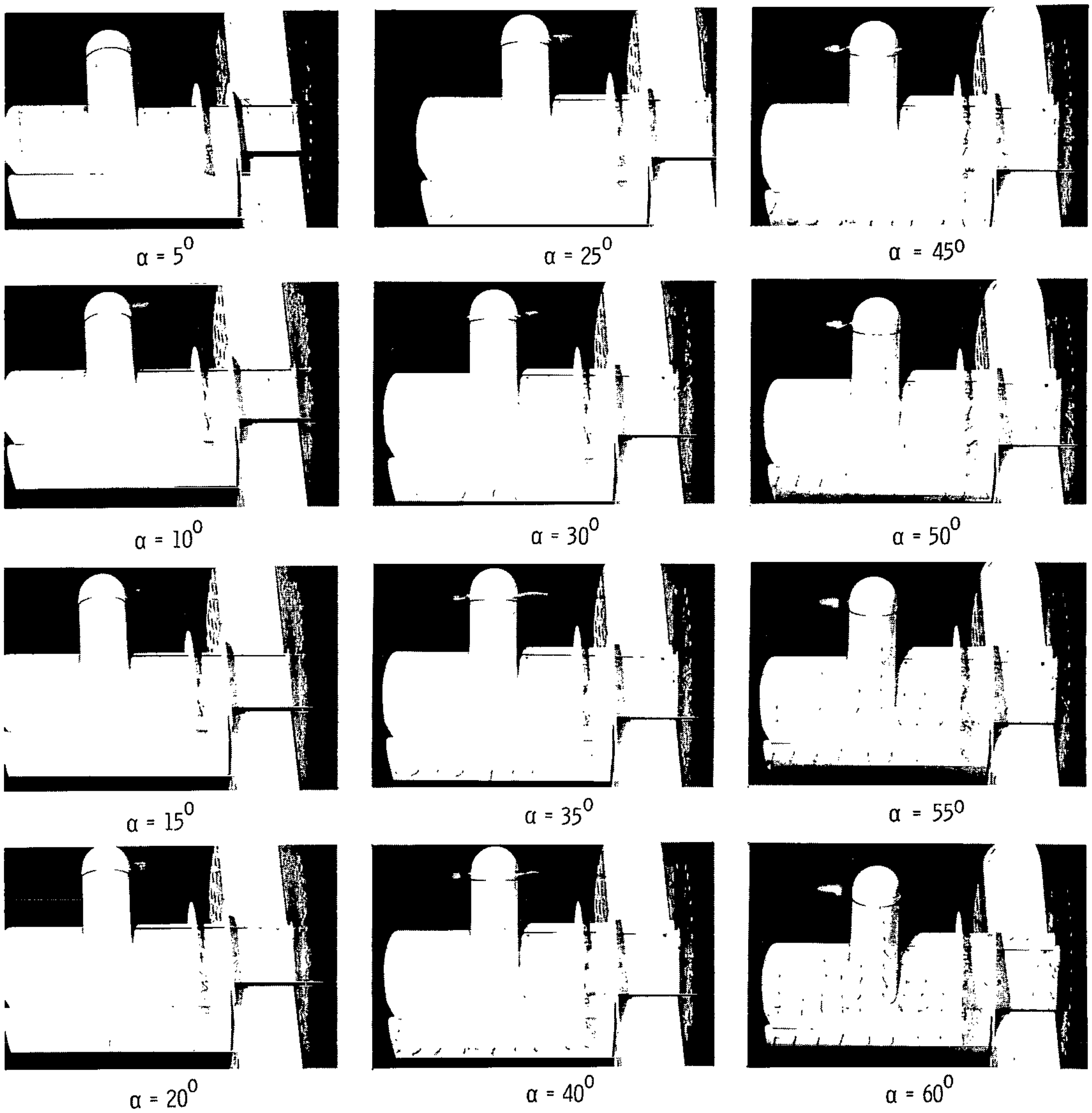
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 23.- Continued.



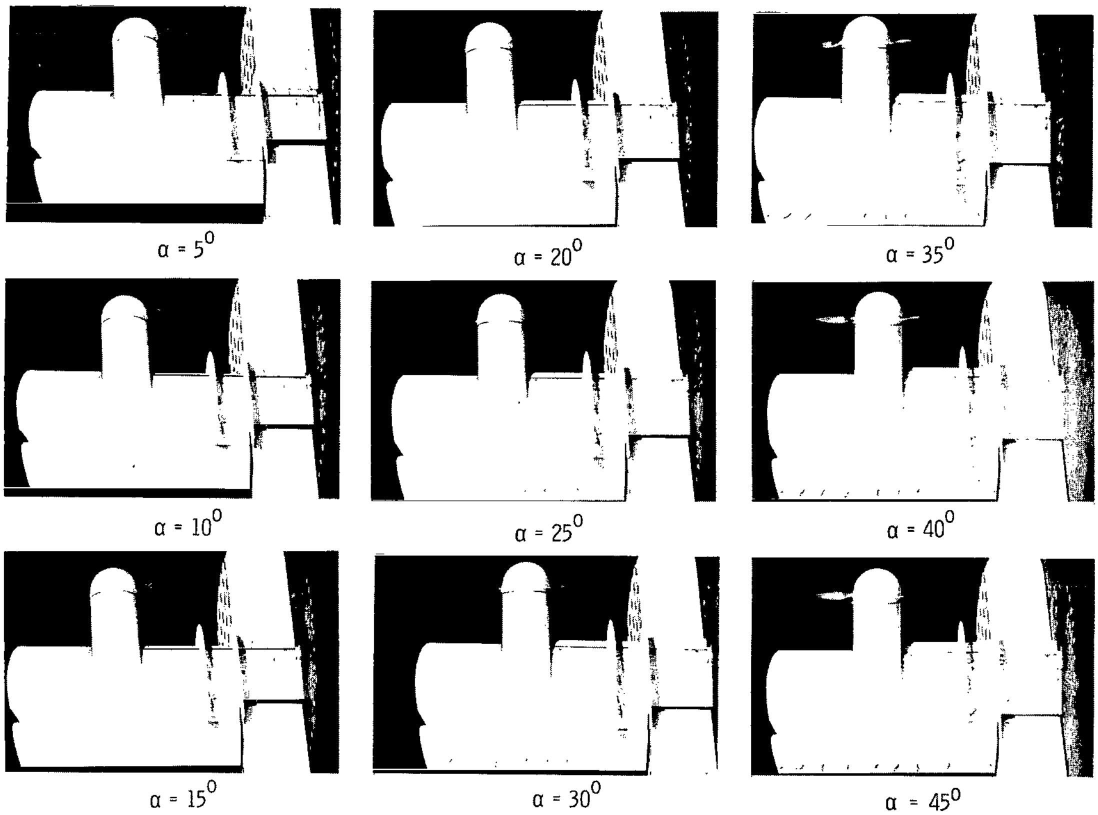
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 23.- Continued.



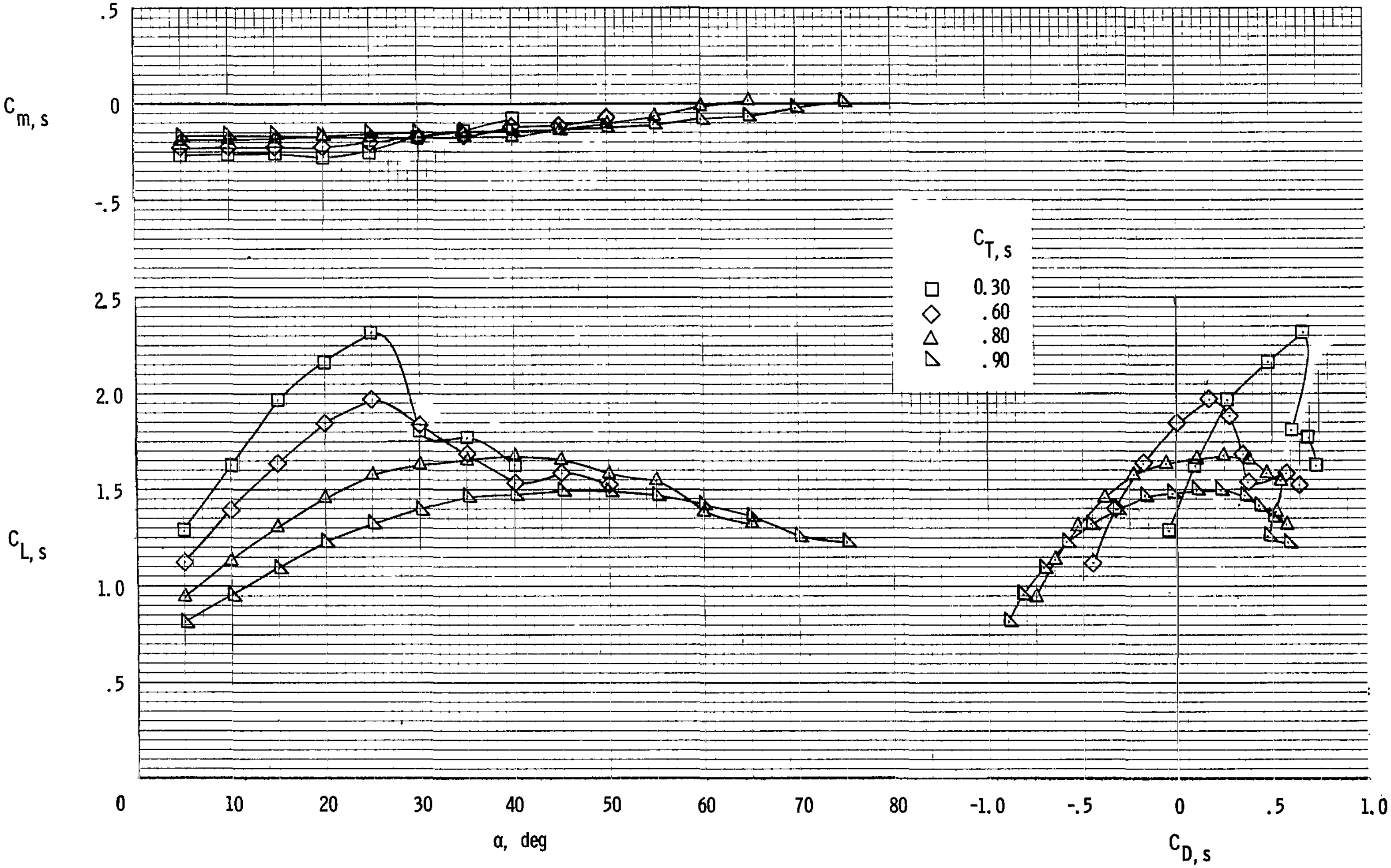
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 23.- Continued.



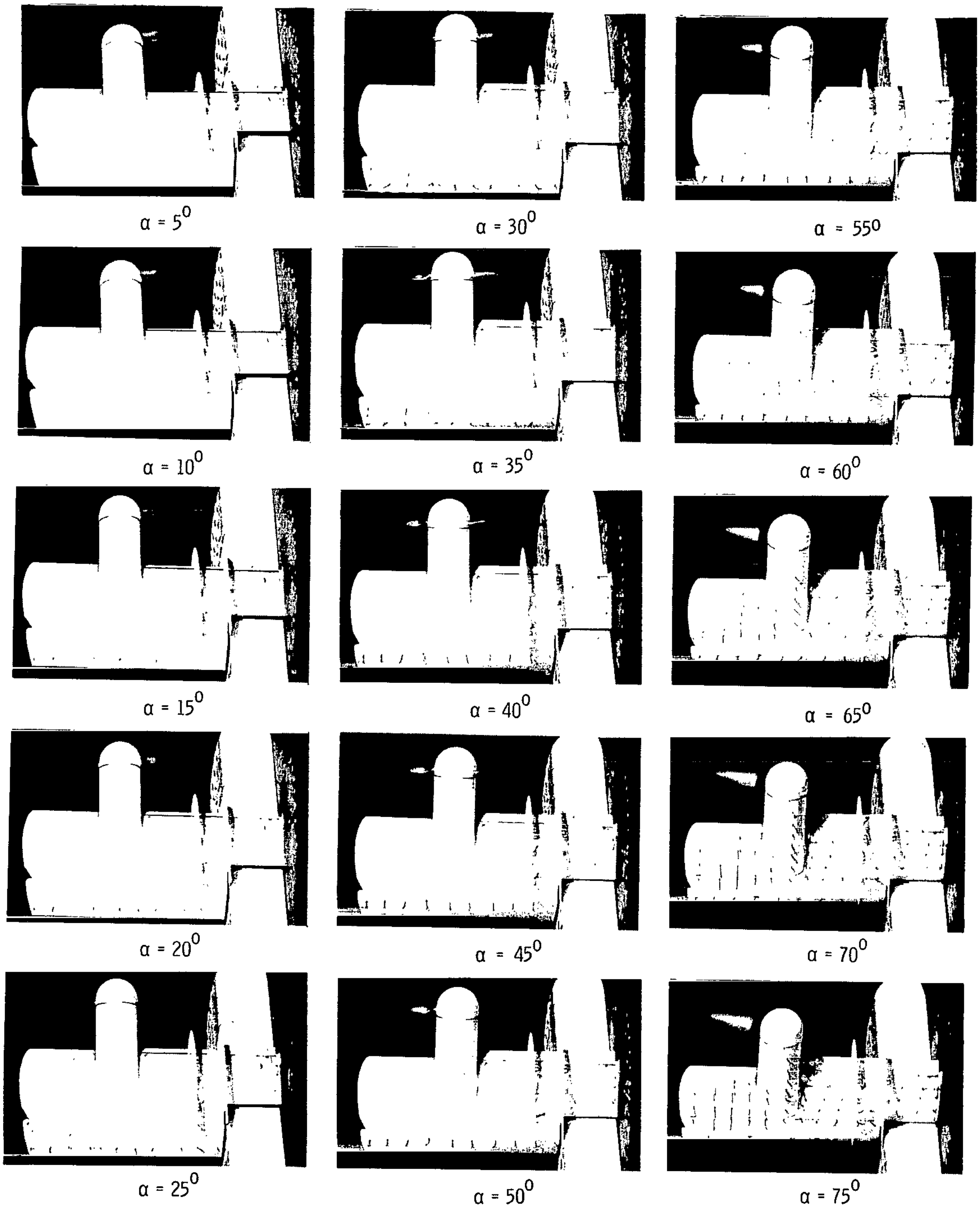
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 23.- Concluded.



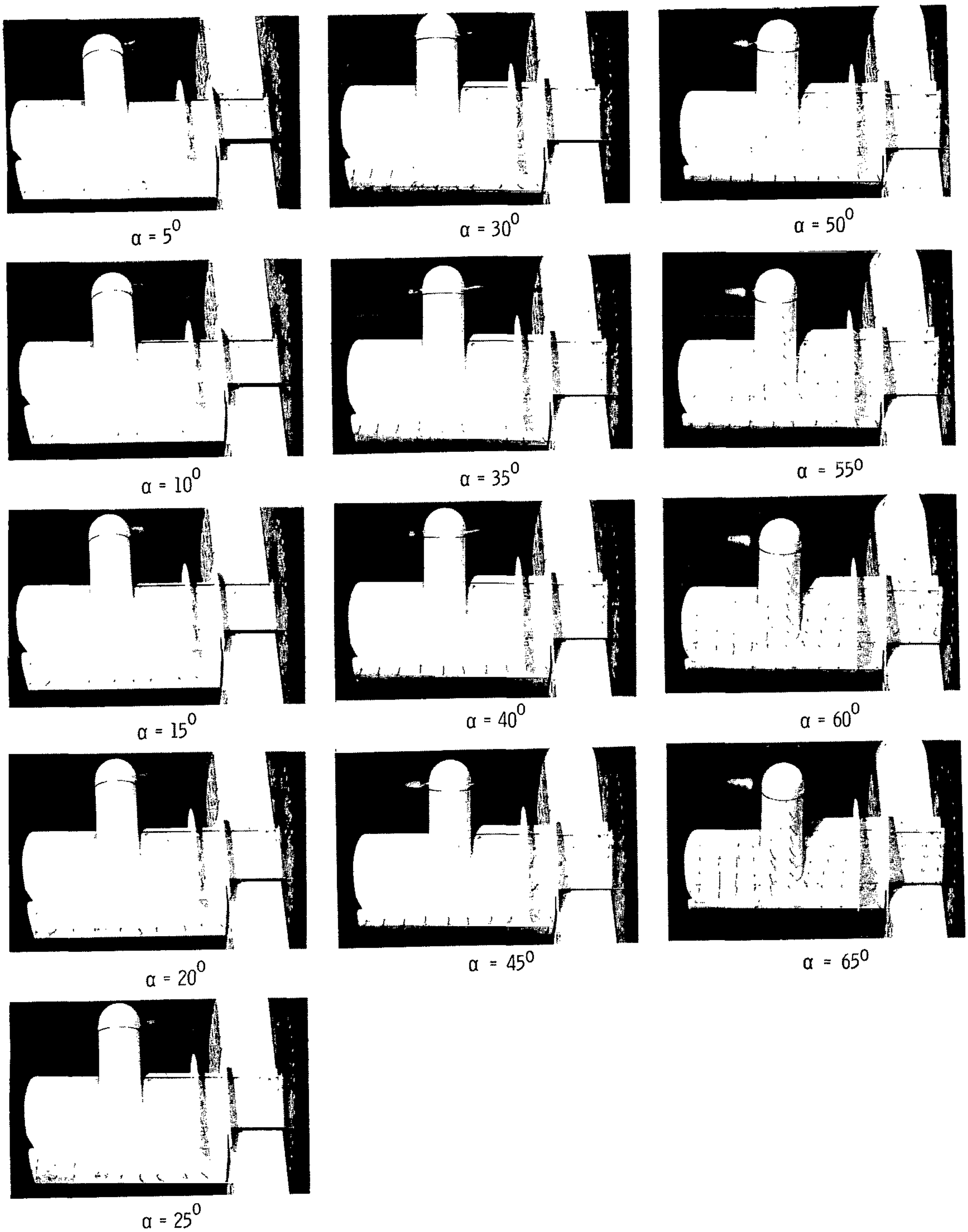
(a) Aerodynamic characteristics.

Figure 24.- Aerodynamic and flow characteristics of the wing with propeller rotation down at the tip. Inboard slat on; fences on; $\delta_f = 40^0$.



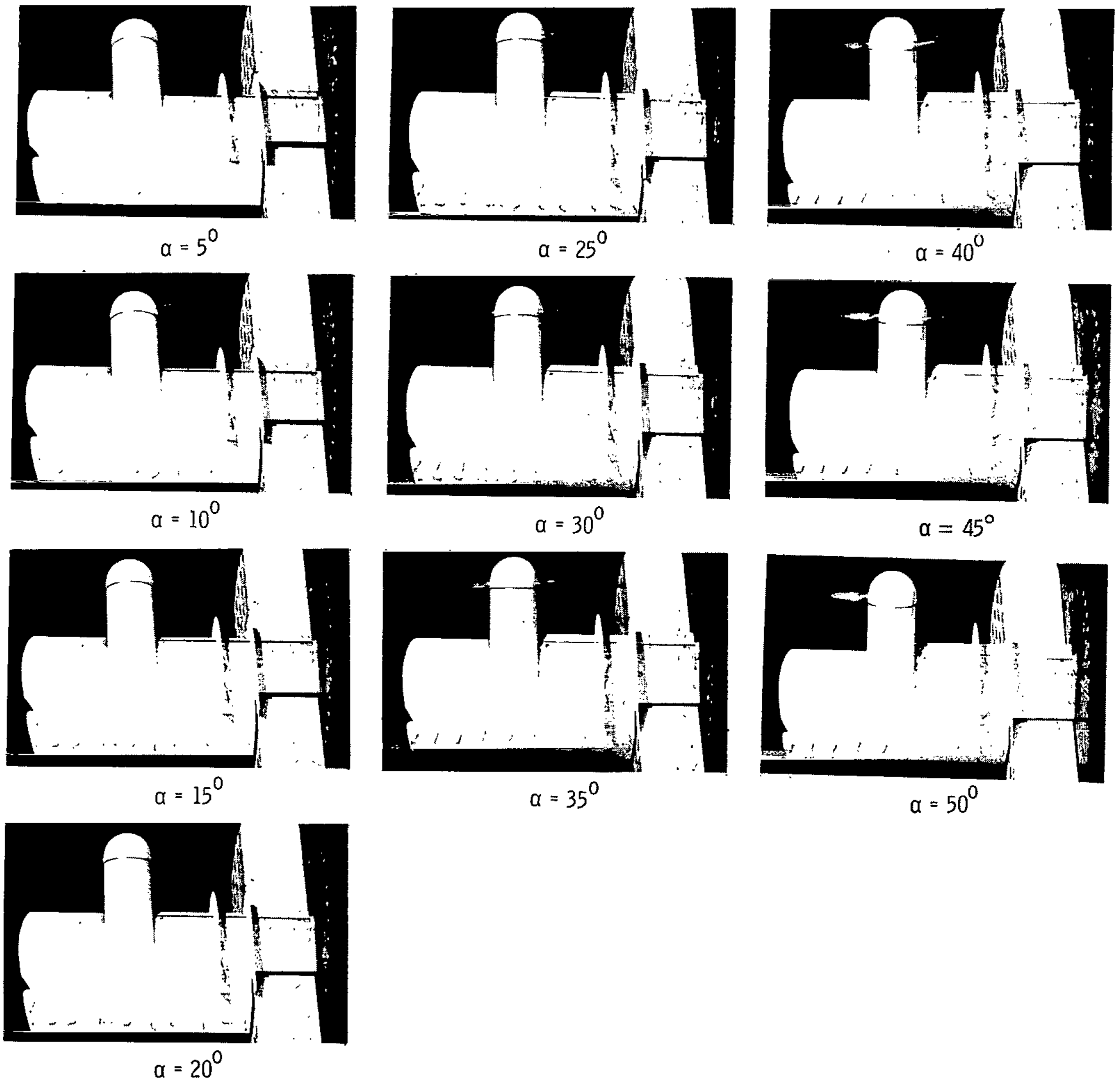
(b) Flow characteristics; $C_{T,s} = 0.90$.

Figure 24.- Continued.



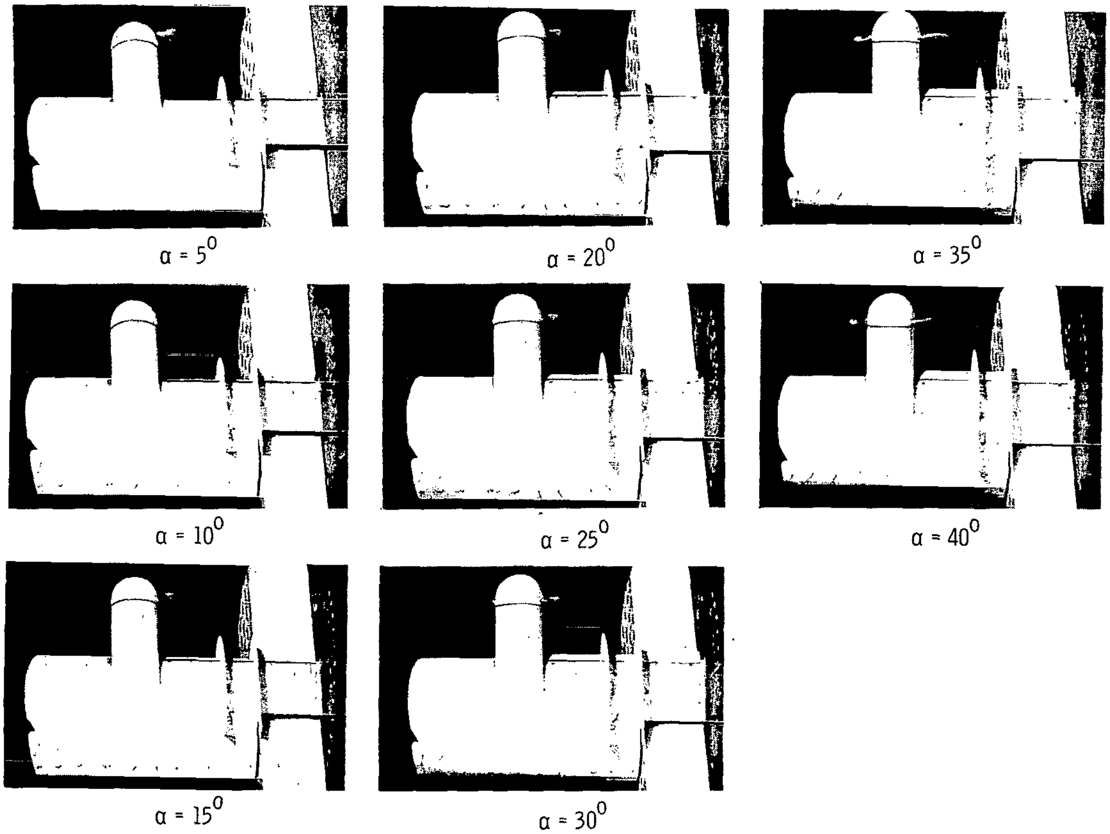
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 24.- Continued.



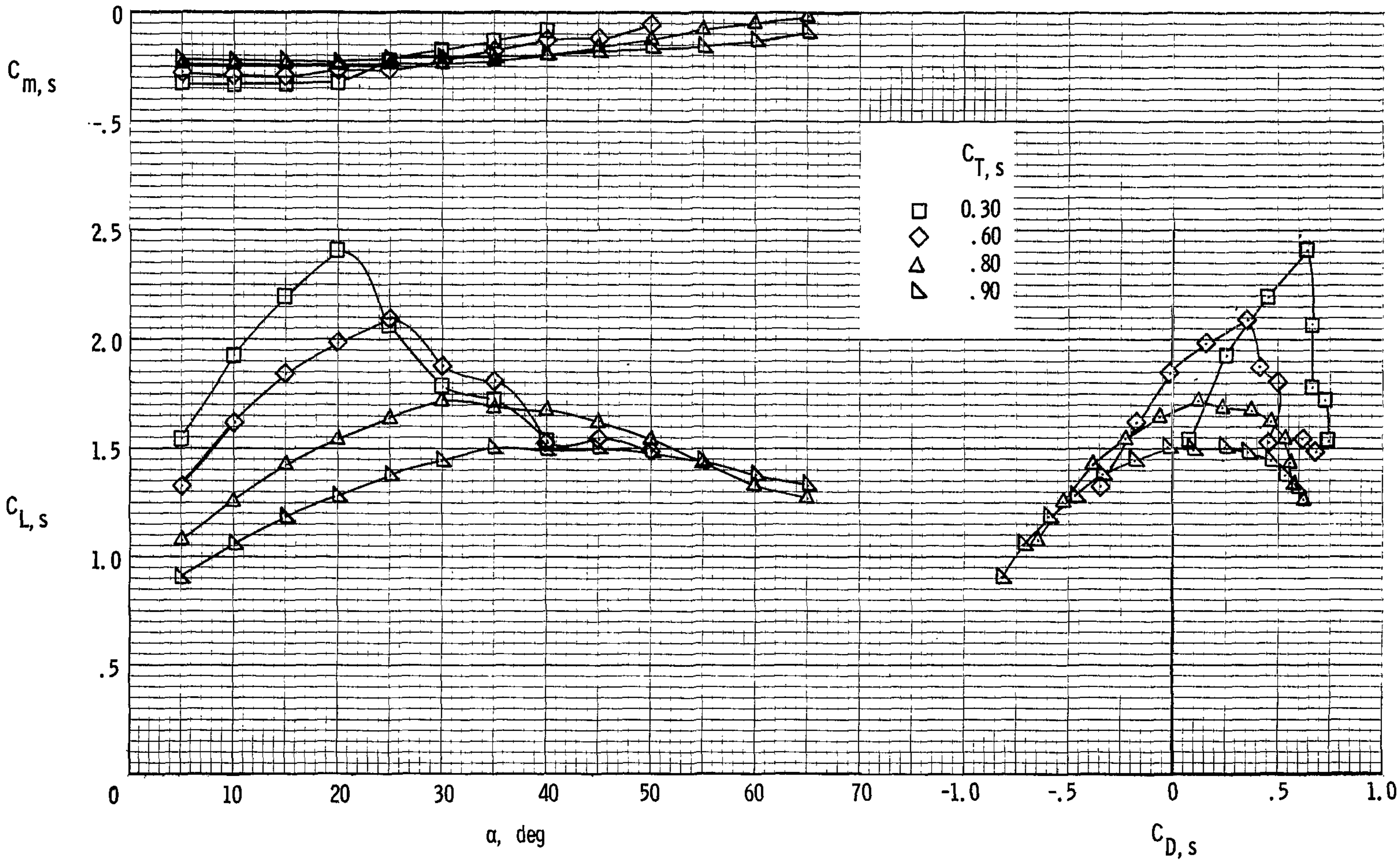
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 24.- Continued.



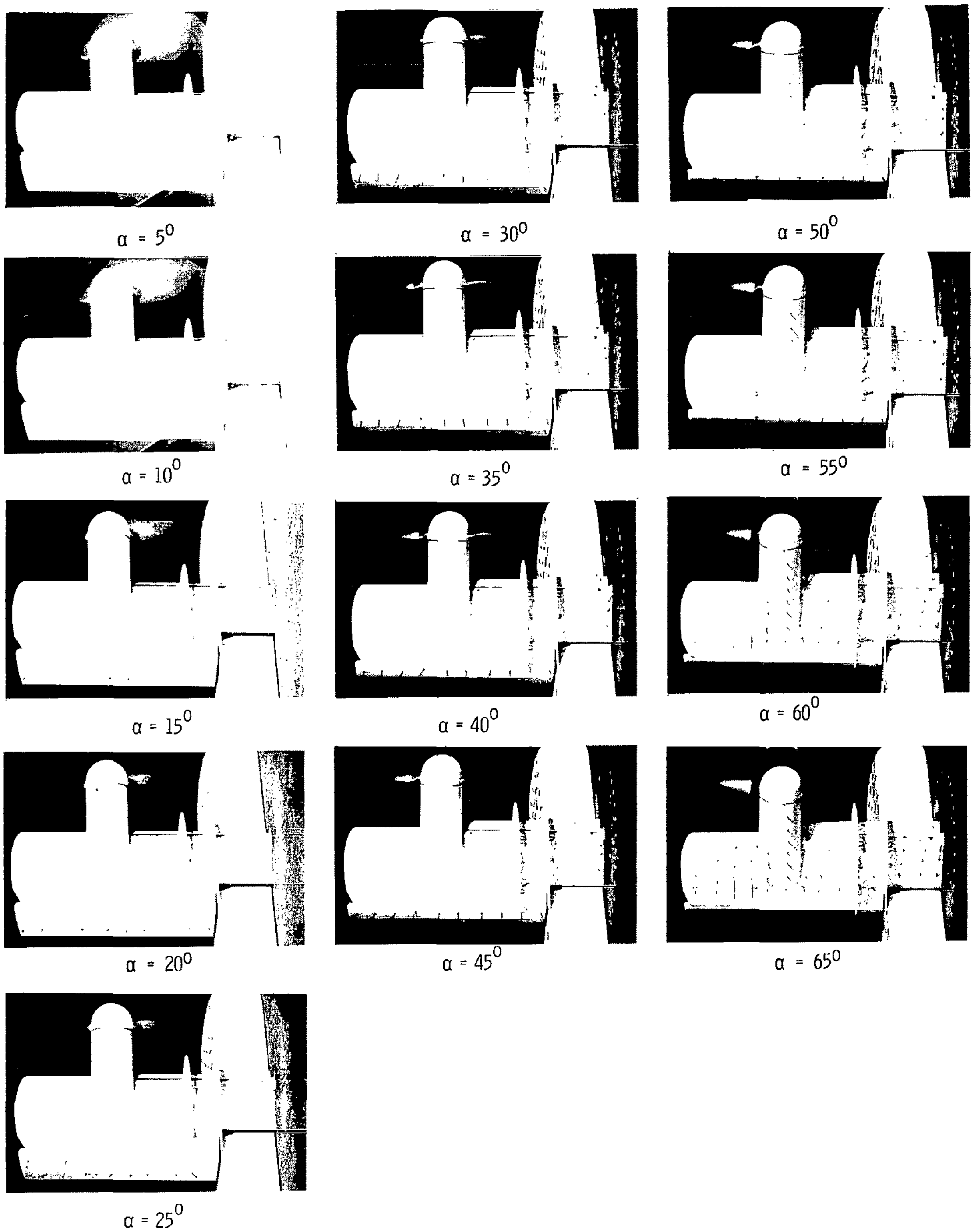
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 24.- Concluded.



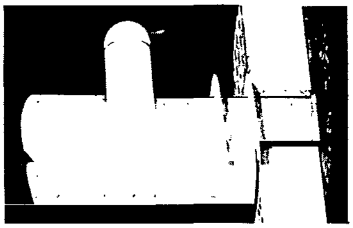
(a) Aerodynamic characteristics.

Figure 25.- Aerodynamic and flow characteristics of the wing with propeller rotation down at the tip. Inboard slat on; fences on; $\delta_f = 50^{0}$.

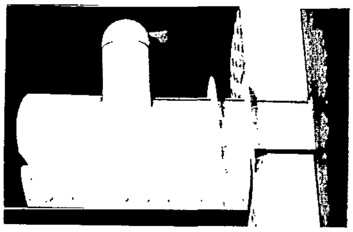


(b) Flow characteristics; $C_{T,s} = 0.90$.

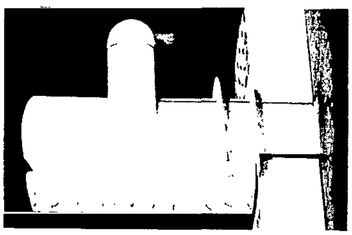
Figure 25.- Continued.



$\alpha = 5^0$

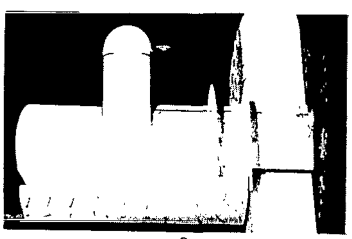


$\alpha = 10^0$

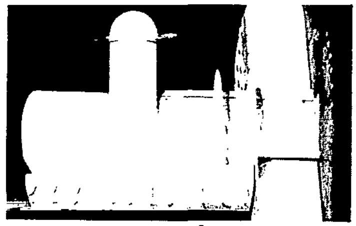


$\alpha = 15^0$

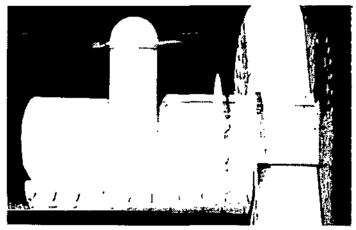
$\alpha = 20^0$



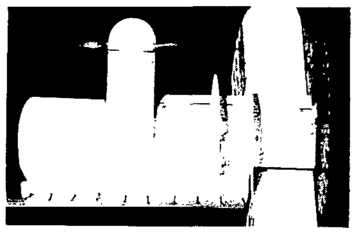
$\alpha = 25^0$



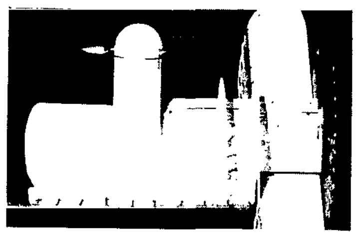
$\alpha = 30^0$



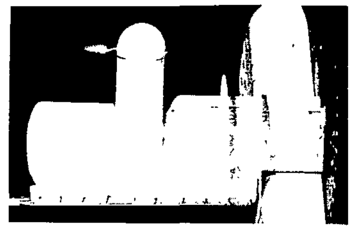
$\alpha = 35^0$



$\alpha = 40^0$

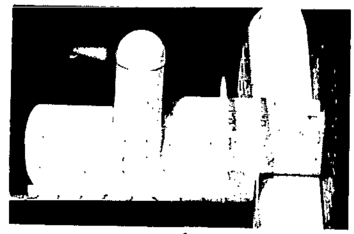


$\alpha = 45^0$

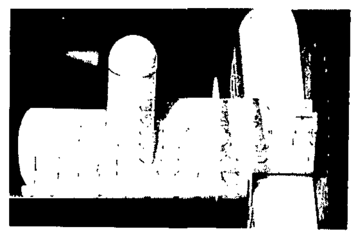


$\alpha = 50^0$

$\alpha = 55^0$



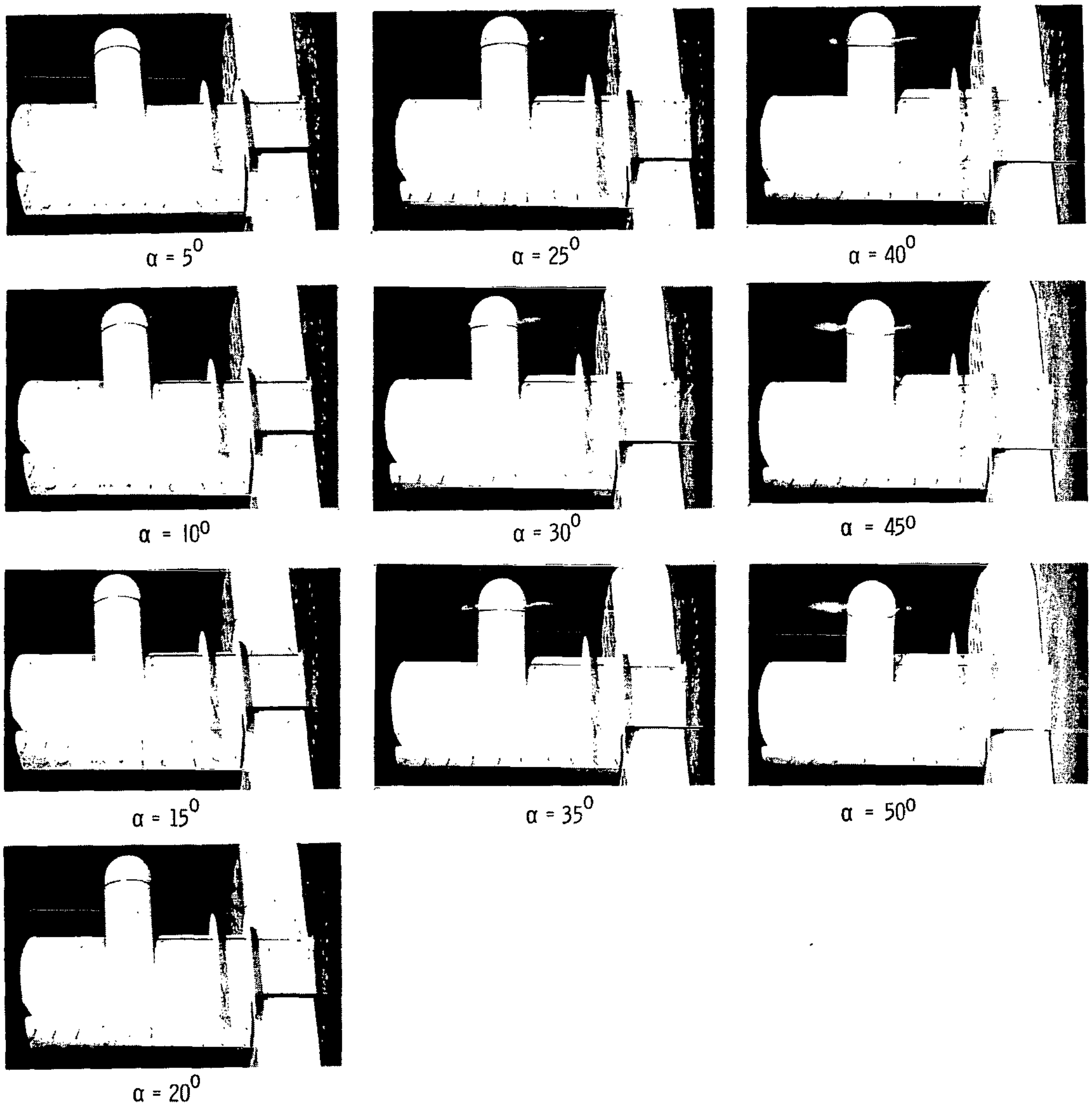
$\alpha = 60^0$



$\alpha = 65^0$

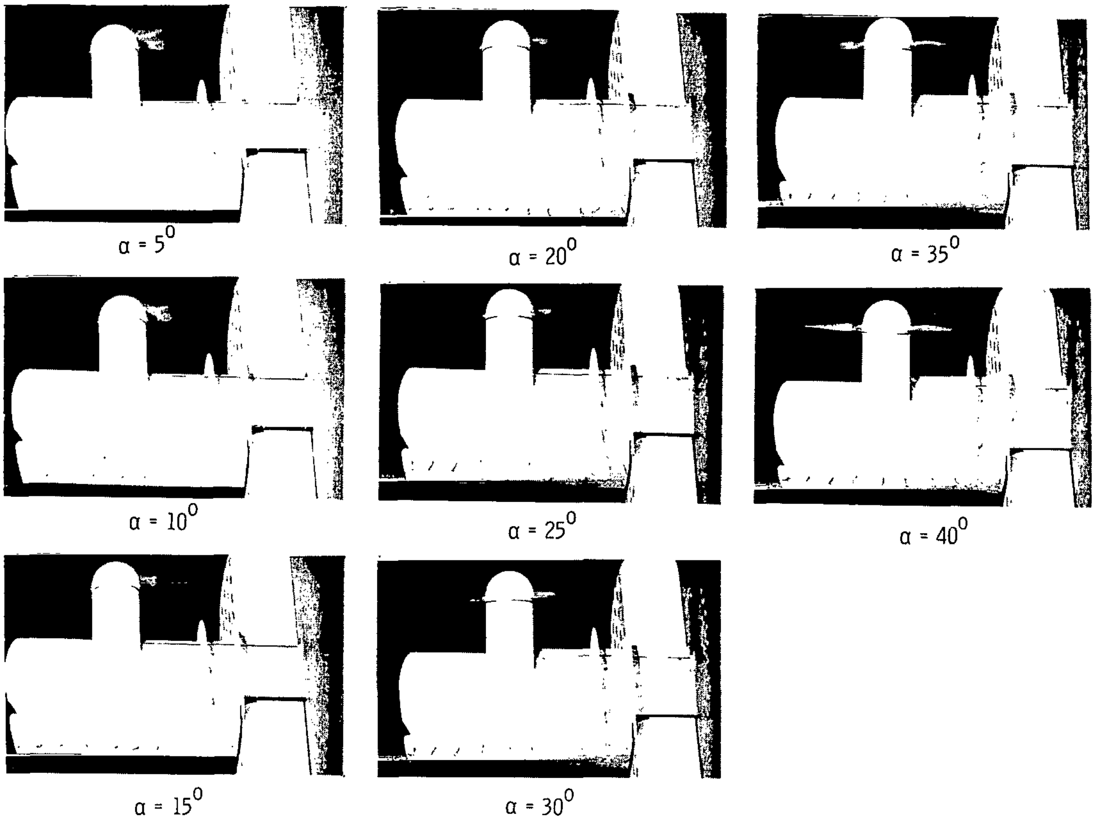
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 25.- Continued.



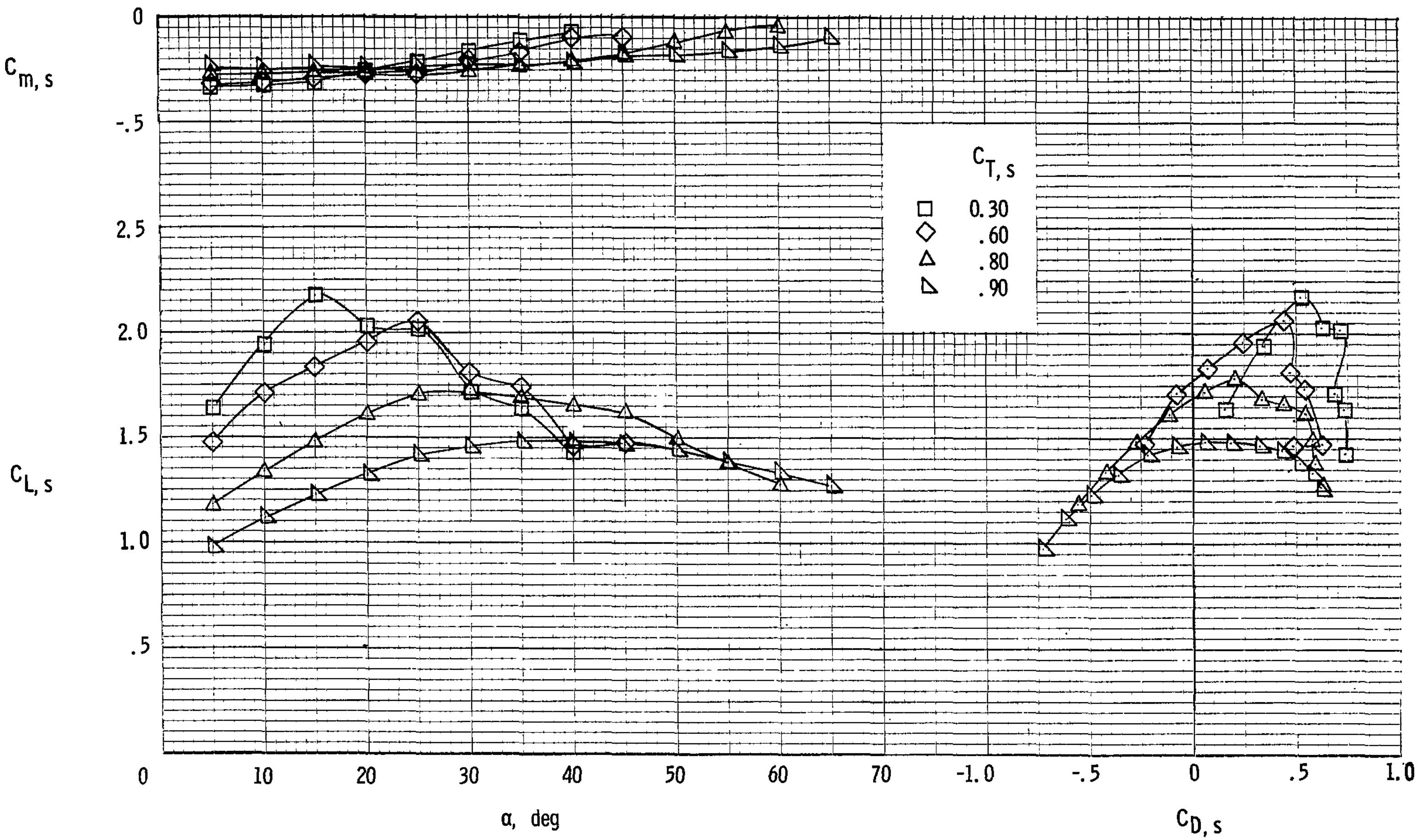
(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 25.- Continued.



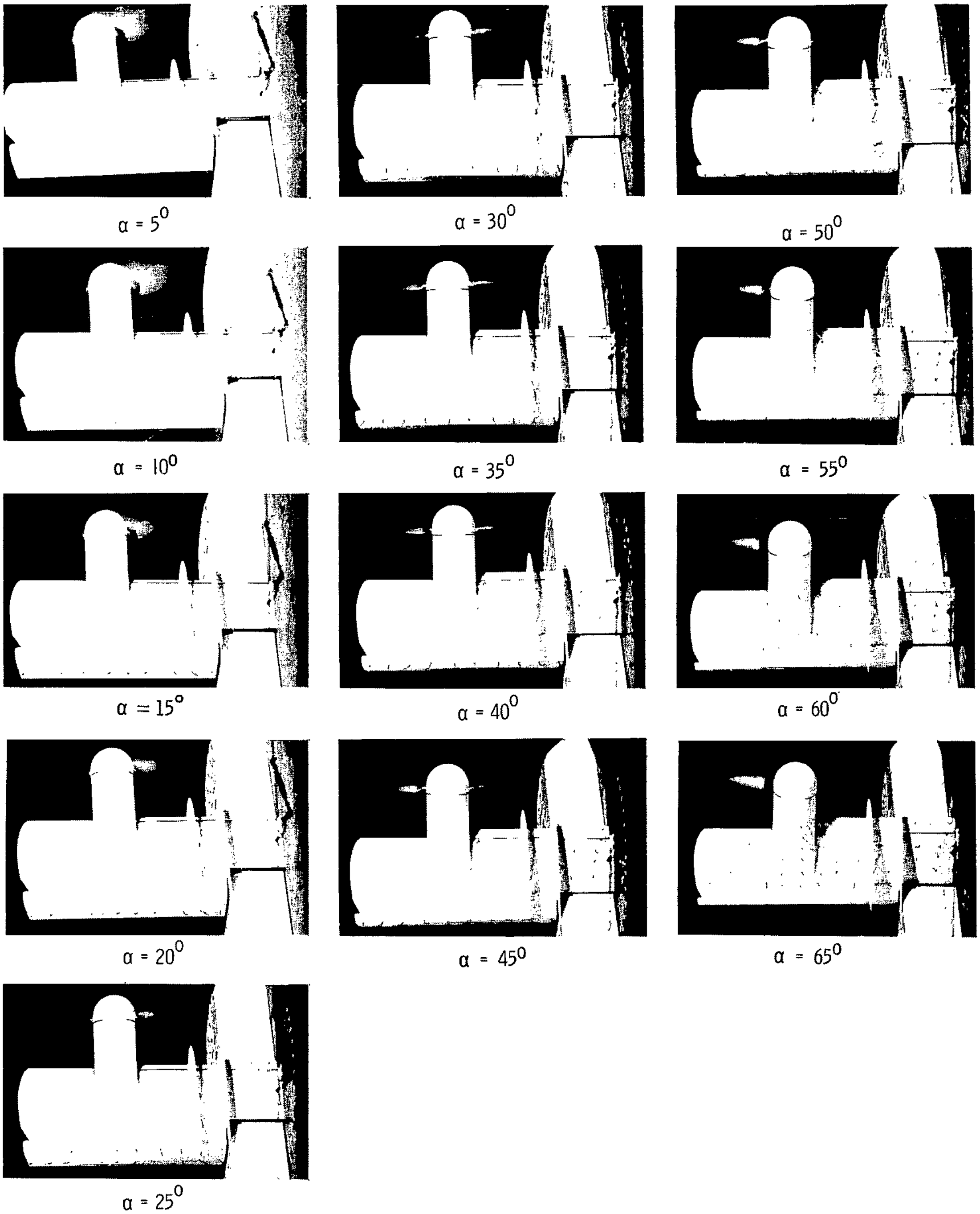
(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 25.- Concluded.



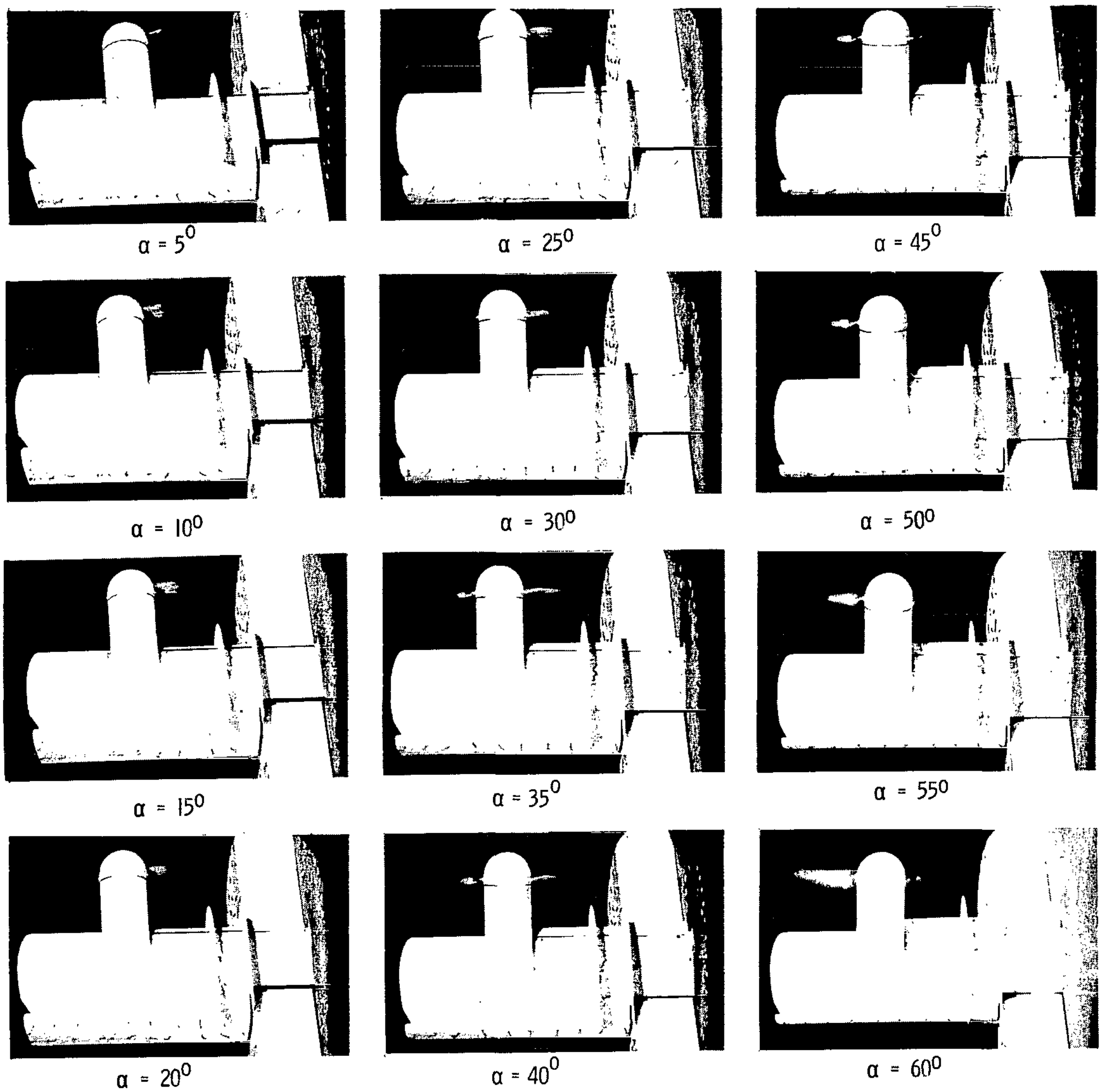
(a) Aerodynamic characteristics.

Figure 26.- Aerodynamic and flow characteristics of the wing with propeller rotation down at the tip. Inboard slat on; fences on; $\delta_f = 60^o$.



(b) Flow characteristics; $C_{T,s} = 0.90$.

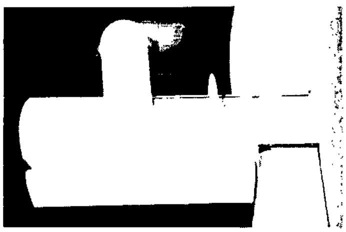
Figure 26.- Continued.



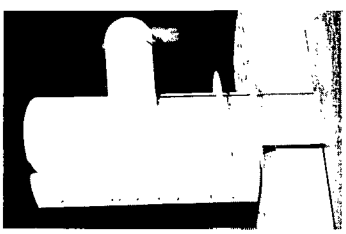
(c) Flow characteristics; $C_{T,s} = 0.80$.

Figure 26.- Continued.

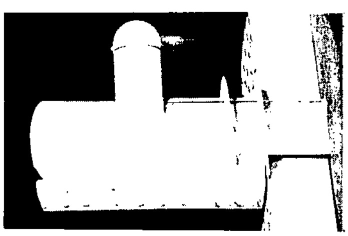
$\alpha = 5^0$



$\alpha = 10^0$



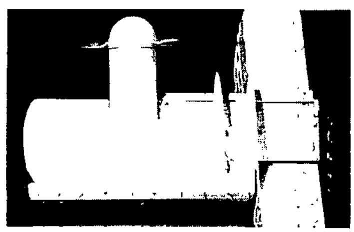
$\alpha = 15^0$



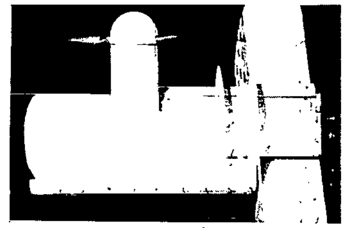
$\alpha = 20^0$

$\alpha = 25^0$

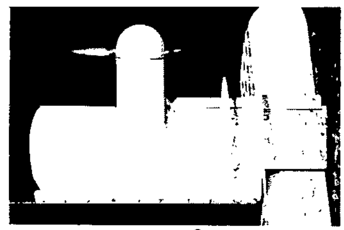
$\alpha = 30^0$



$\alpha = 35^0$



$\alpha = 40^0$

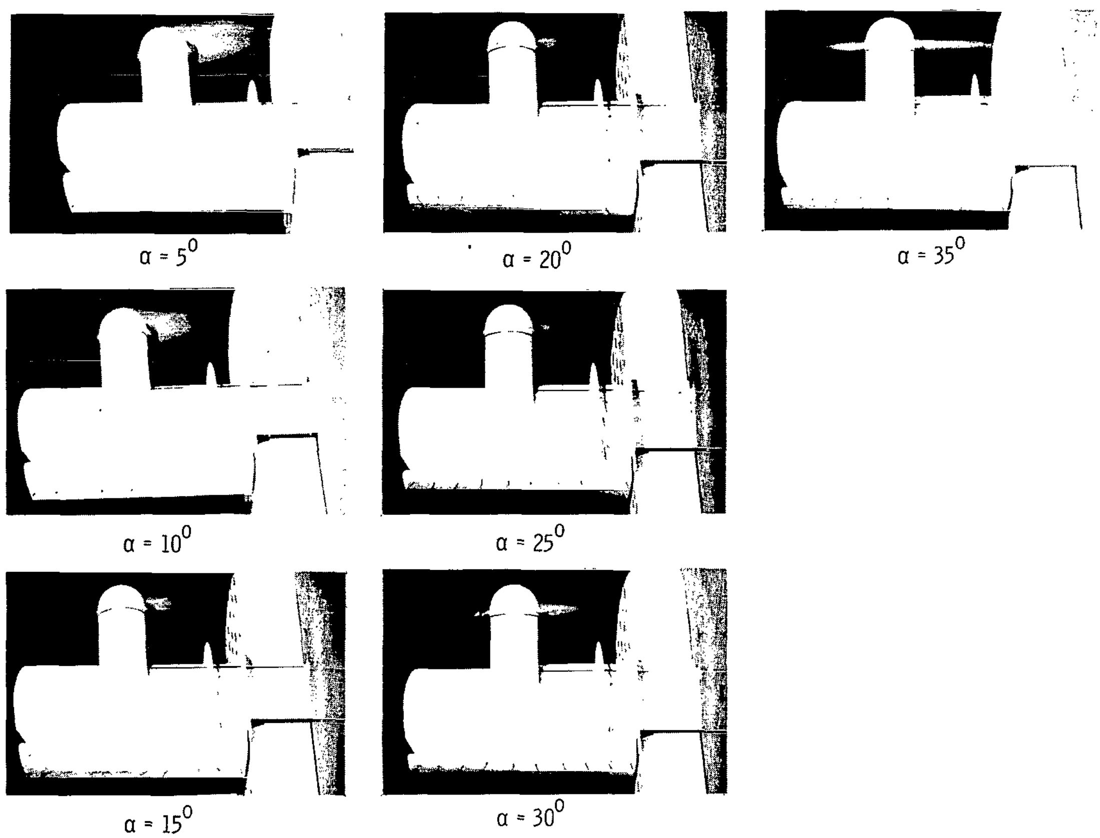


$\alpha = 45^0$

$\alpha = 50^0$

(d) Flow characteristics; $C_{T,s} = 0.60$.

Figure 26.- Continued.



(e) Flow characteristics; $C_{T,s} = 0.30$.

Figure 26.- Concluded.

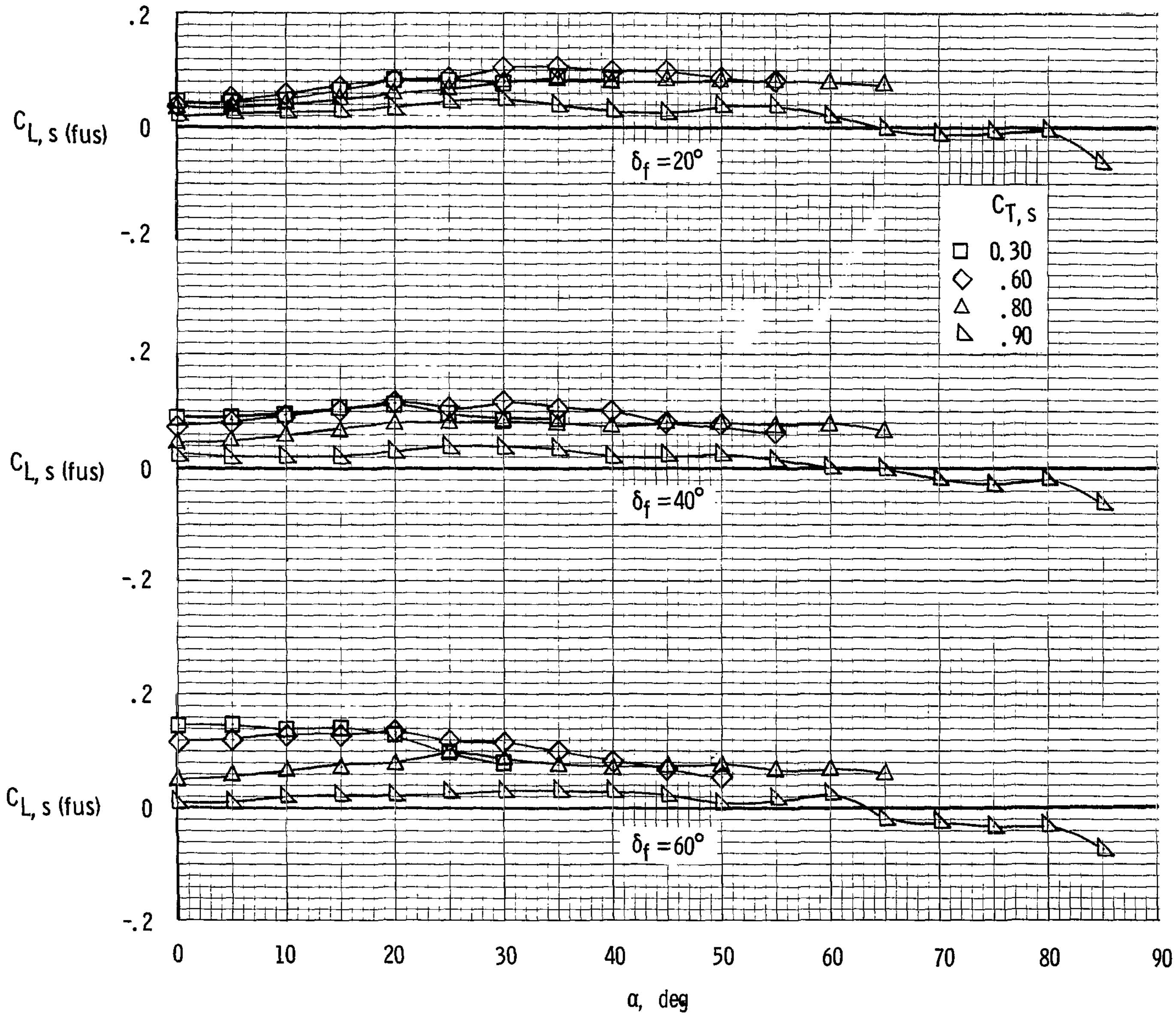


Figure 27.- Fuselage lift coefficients with propeller rotation up at the tip. Basic leading edge.

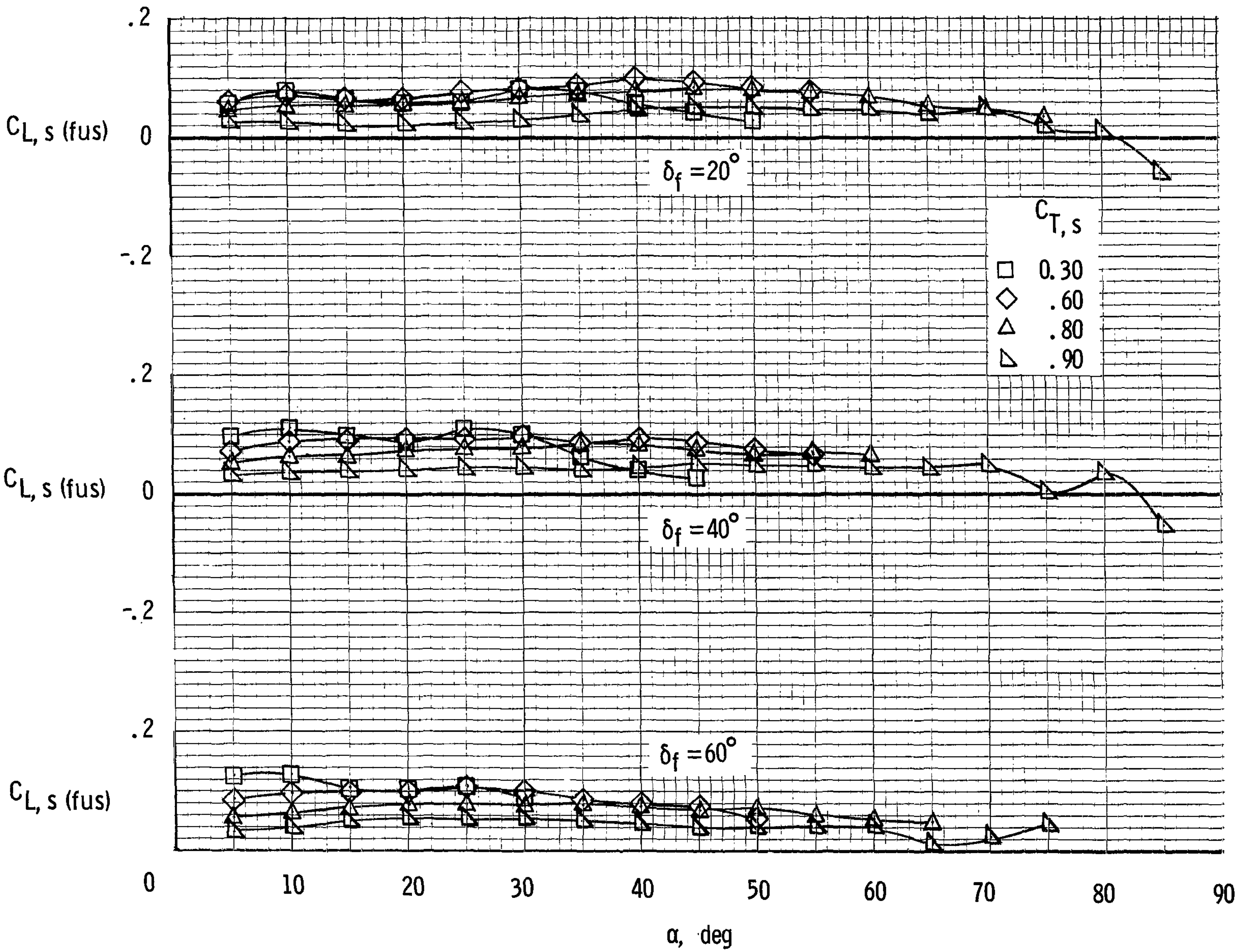


Figure 28.- Fuselage lift coefficients with propeller rotation up at the tip. Inboard slat on.

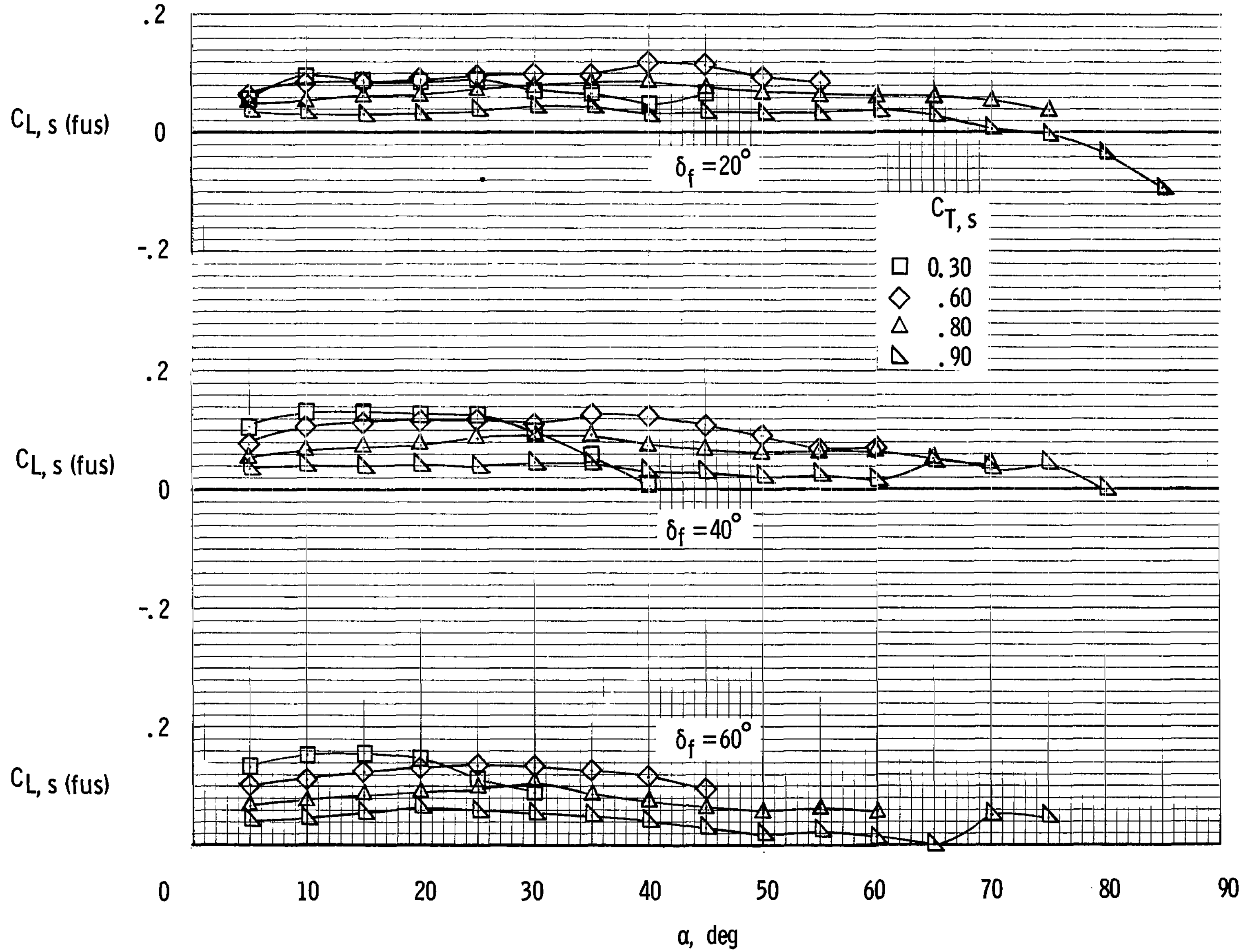


Figure 29.- Fuselage lift coefficients with propeller rotation up at the tip. Inboard slat on; fences on.

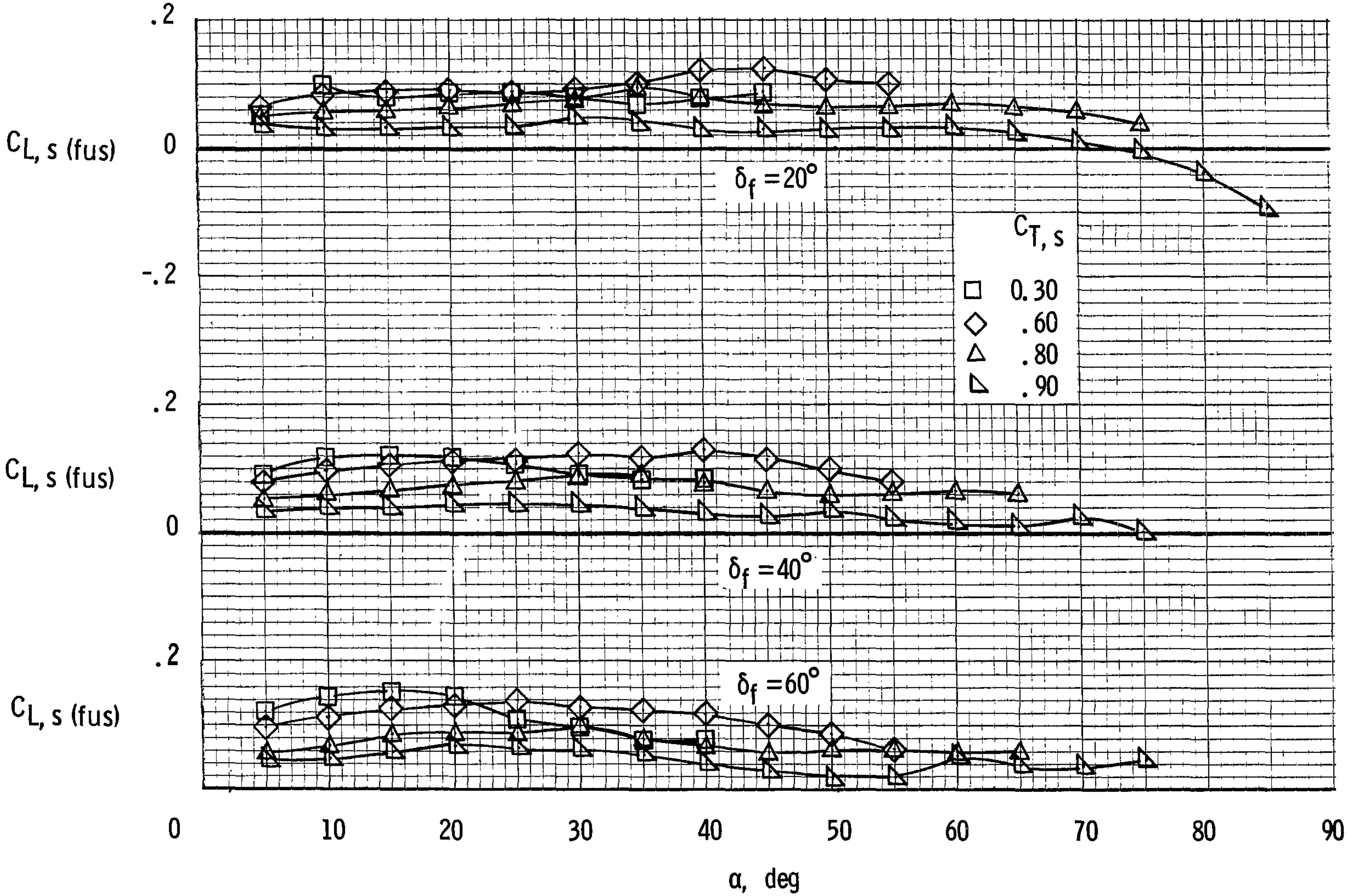


Figure 30.- Fuselage lift coefficients with propeller rotation up at the tip. Full-span slat on; fences on.

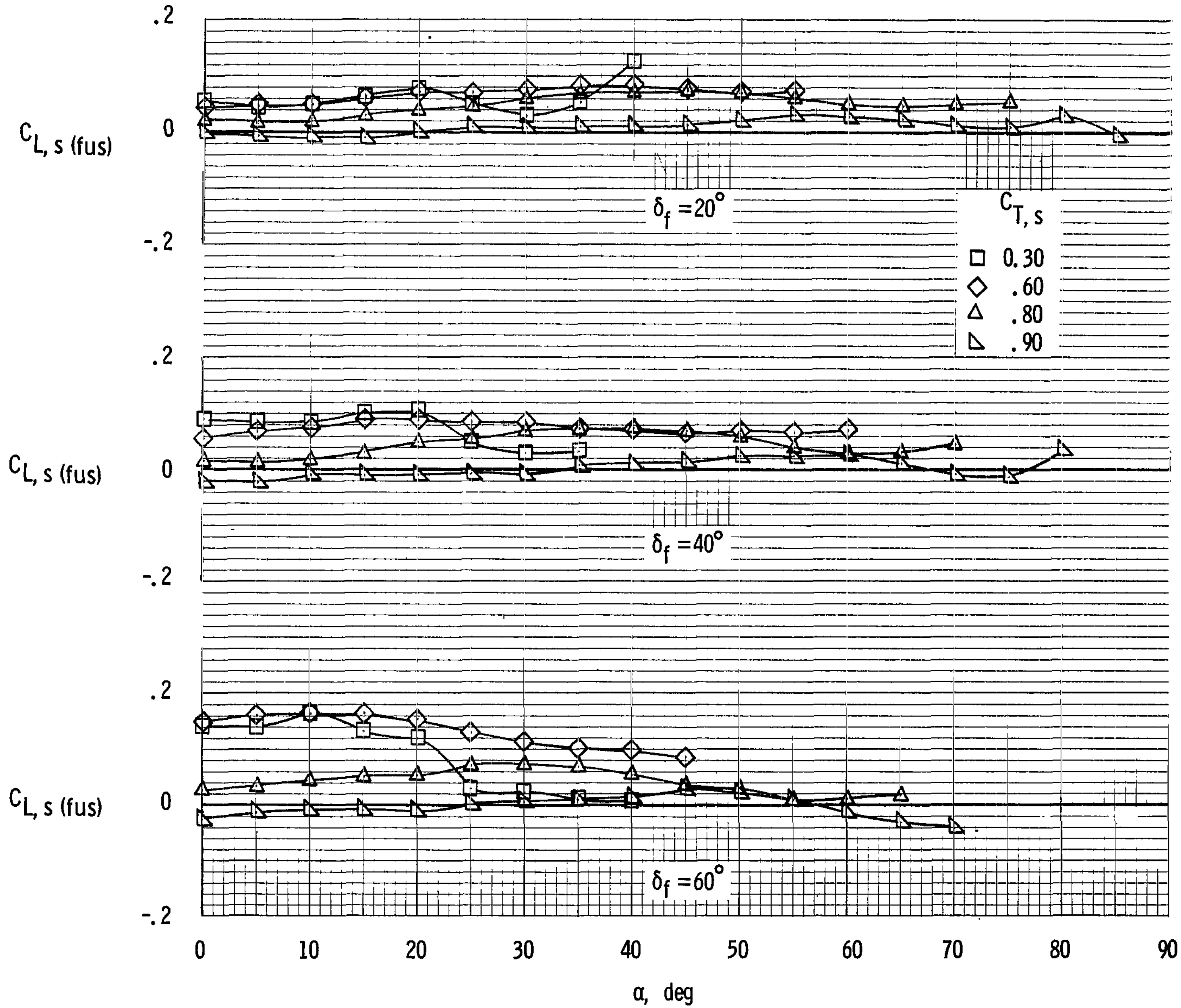


Figure 31.- Fuselage lift coefficients with propeller rotation down at the tip. Basic leading edge.

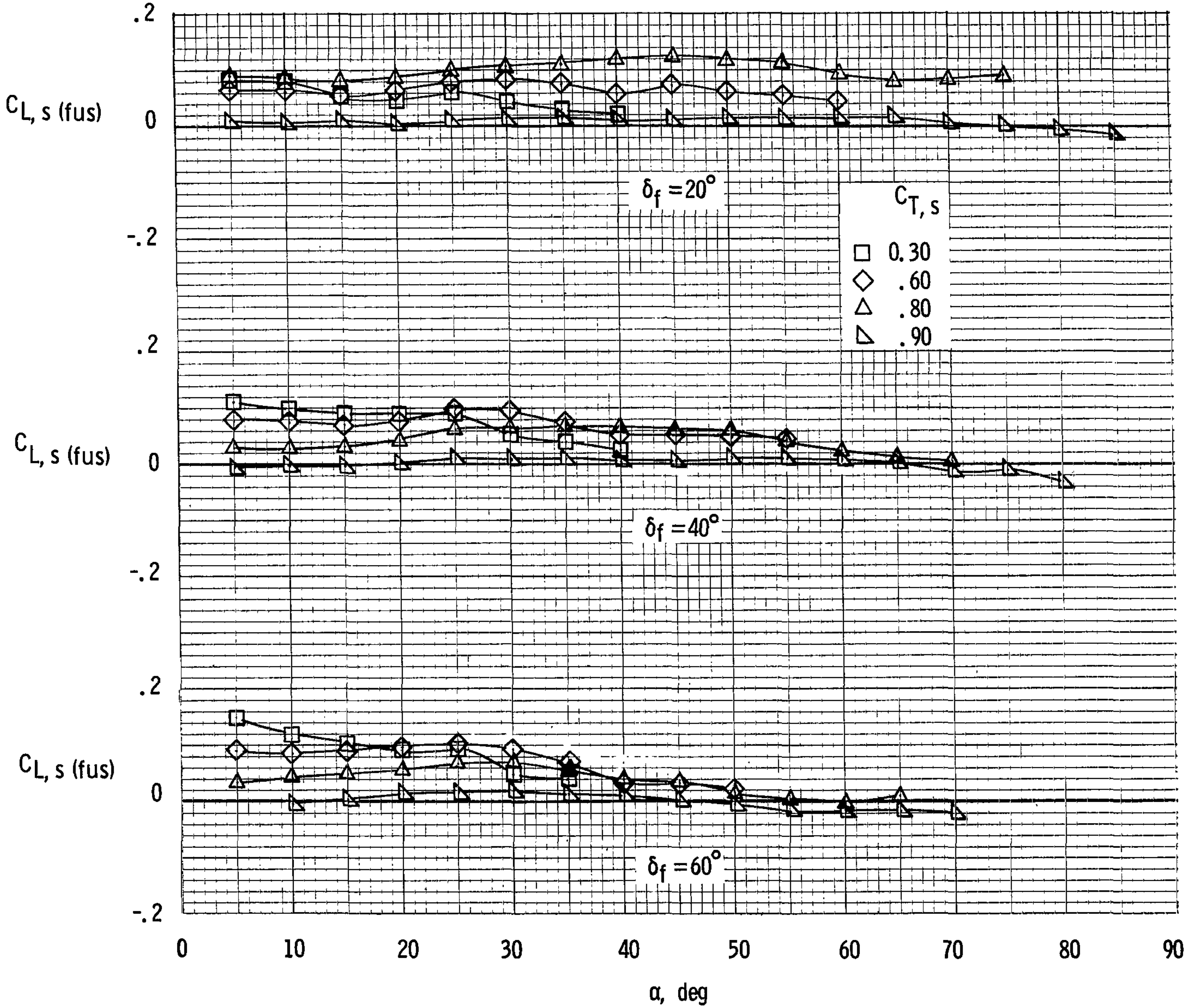


Figure 32.- Fuselage lift coefficients with propeller rotation down at the tip. Inboard slat on.

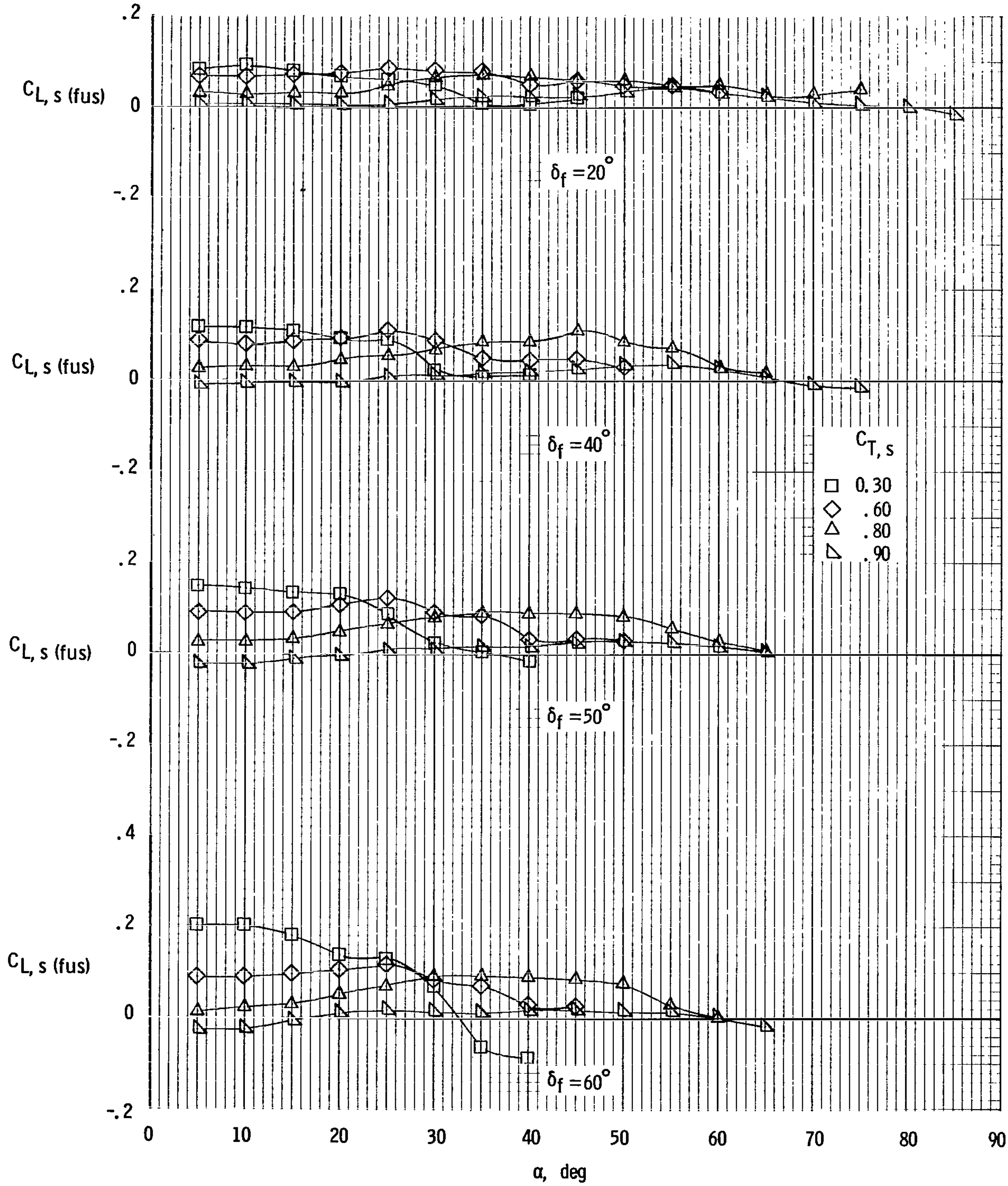


Figure 33.- Fuselage lift coefficients with propeller rotation down at the tip. Inboard slat on; fences on.

"The aeronautical and space activities of the United States shall be conducted so as to contribute . . . to the expansion of human knowledge of phenomena in the atmosphere and space. The Administration shall provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."

—NATIONAL AERONAUTICS AND SPACE ACT OF 1958

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